Thermophysical Properties of High Temperature Solid Materials

VOLUME 2: NONFERROUS ALLOYS

Part II: Nonferrous Multiple Alloys

Thermophysical Properties
Research Center, Purdue University
Y. S. TOULOUKIAN, Editor

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PREFACE

The phenomenal growth of science and technology since the early forties has brought about a universal appreciation of the fact that present limitations in many technical developments are often a direct result of the paucity of knowledge on the properties of materials. Engineering developments in the years ahead will be closely linked to the research that is done today to contribute to a better understanding of the properties of matter, of which thermophysical properties constitute a major segment.

With a realization of the seriousness of this situation, a great deal of research effort has been made in recent years on the thermophysical properties of materials with the result that the volume of research literature has increased many fold. In spite of this fact, it is generally agreed that the present level of research on thermophysical properties still falls substantially short of existing needs and anticipated future demands. However, what is even more disturbing is the fact that engineering groups across the nation are using no more than a fraction of the information already available, either because it is in a form not directly useful to them or, often, because its existence is not generally known.

To partially remedy this situation concerning the thermophysical properties of high temperature materials, the Materials Laboratory of the U.S. Air Force at Wright-Patterson Air Force Base sponsored a project in 1957 to bring together a large portion of the then available data in a single work for easy reference. From this compilation, performed by the Armour Research Foundation, a four-volume work entitled *Handbook of Thermophysical Properties of Solid Materials* emerged. It was first published in 1960 as WADC TR58-476; in 1961 it was issued as a hard-bound set by The Macmillan Company.

Because of the favorable reception given to this original work, the Materials Laboratory of the U.S. Air Force requested the Thermophysical Properties Research Center (TPRC), in 1964, to update and revise this reference work in order to increase its usefulness and to put it on a more current basis. The present six-volume work, entitled *Thermophysical Properties of High Temperature Solid Materials*, consists of nine books totaling more than 8,500 pages. It is the result of a two-year project by TPRC. This new encyclopedic reference work cannot be called a revised edition of the earlier publication since nearly every page has been changed through major additions, corrections, and re-evaluation. An effort was made to adhere to the basic format of the earlier work. However, the organization of the material and the index to materials have been completely redesigned for greater ease in locating the information desired.

Inevitably, not all of the properties covered have received the same degree of attention. The material on thermal radiative properties, thermal diffusivity, and specific heat has been totally revised and rewritten. Materials on the coefficient of thermal expansion and thermal conductivity have received major revisions, and those on electrical resistivity, density, and melting point have had moderate revisions. Finally, lesser revisions were made to data concerning vapor pressure and heats of transformation. The new information incorporated into the work covered research conducted primarily during the years 1957 to 1964, although some major references are included from 1965 and some from as far back as 1910.

In processing the large amount of new and old data incorporated in these volumes, it was necessary that some degree of selectivity be exercised both from the standpoint of the references cited and the data extracted from them. It is hoped, however, that no major source of information has been omitted. Whenever possible, an effort was made to suggest recommended values of the properties. In the plots, recommended values are indicated by curves. It should be clear, however, that the designation of "recommended values" in no way implies that a critical analysis has been performed in all cases, nor does it suggest that they repre-

sent definitive values. Because most of the materials covered are not well-defined engineering materials, and because there is often a great paucity of information, any critical evaluation of these data is most difficult—if not impossible.

With a full appreciation of these inherent difficulties it is nevertheless hoped that the present compendia will prove to be of great usefulness to engineers seeking information on thermophysical properties. In spite of the extreme care exercised in processing the data and proofing the manuscript, it is possible that some errors might have been inadvertently overlooked. Should any instance of such oversight be uncovered, the Editor would be most indebted if it is brought to his attention.

The fact that such an enormous undertaking could be accomplished in such a short time is attributable primarily to TPRC's unique resources in the area of thermophysical properties information. Grateful acknowledgment is made to the Electronic Properties Information Center for assistance in providing bibliographic searches on electrical resistivity and to the Air Force Materials Laboratory for general assistance in bibliographic information. Extensive personal inquiries were made to the authors of research papers and reports requesting clarification and original data. The enthusiastic response to these inquiries (in the majority of the cases) is also gratefully acknowledged. The Editor and . contributing staff wish to give a special note of thanks in acknowledging the valuable assistance and cooperation they received individually and collectively from TPRC's Scientific Documentation Division personnel and the supporting staff of graphics and technical typists without whose painstaking and skillful contributions this work would not have been possible.

This work was performed under Contract No. AF33(615)1642, sponsored by the Air Force Materials Laboratory, Research and Technology Division, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. The personnel directly affiliated with this program were Mr. D. A. Shinn, Chief, Materials Information Branch; Mr. E. Dugger, Technical Manager, Information Processing; and Mr. J. H. Charlesworth, engineer in charge of this project. Their understanding cooperation has contributed much to the success of the program.

It is sincerely hoped that *Thermophysical Properties of High Temperature Solid Materials* will constitute an even more valuable contribution to technology than its predecessor. This work should prove to be an invaluable source of information on an important group of properties of materials to every engineer, providing him with reliable information of a scope that would be impossible for any one individual to master. If we have been able o approach these goals, the results will be highly gratifying.

June 1966

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EXPLANATORY TEXT

I. SCOPE OF COVERAGE

Thermophysical Properties of High Temperature Solid Materials comprises six volumes. Volumes 2, 4, and 6 each consist of two parts because of the large amount of material covered. The general contents of the respective volumes are as follows:

Volume 1—Elements
Volume 2—Nonferrous Alloys
  PART I—Nonferrous Binary Alloys
  PART II—Nonferrous Multiple Alloys
Volume 3—Ferrous Alloys
Volume 4—Oxides and Their Solutions and Mixtures
  PART I—Simple Oxygen Compounds and Their Mixtures
  PART II—Solutions and Their Mixtures of Simple Oxygen Compounds, Including Glasses and Ceramic Materials
Volume 5—Nonoxides and Their Solutions and Mixtures, Including Miscellaneous Ceramic Materials
Volume 6—Intermetallics, Cermets, Polymers, and Composite Systems
  PART I—Intermetallics
  PART II—Cermets, Polymers, and Composite Systems

The specific properties covered in each volume are:

1. Density (ρ)
2. Melting Point (M. P.)
3. Heat of Fusion (Δh_f)
4. Heat of Vaporization (Δh_v)
5. Heat of Sublimation (Δh_s)
6. Electrical Resistivity (r)
7. Specific Heat at Constant Pressure (c_p)
8. Thermal Conductivity (k)
9. Thermal Diffusivity (α)
10. Thermal Linear Expansion ($\Delta L/L$)
11. Thermal Radiative Properties:
    Absorptance (α), Emittance (ϵ), Reflectance (ρ), and Transmittance (τ)
12. Vapor Pressure (p)

Generally, only materials with melting points above 800°K (approximately 1000°F) are included, except for materials within the categories of polymers, plastics, and composites. A detailed discussion of the material classification procedure is presented in the following sections. A Material Index for the entire work is included at the end of each volume.

II. TPRC CLASSIFICATION OF MATERIALS

Materials are classified into the eight categories listed below. Whenever applicable, the compositions are reported in weight percent of the constitutents. For purposes of material classification TPRC considers the following elements as nonmetallic: H, He, C, N, O, F, Ne, P, S, Cl, A, Br, Kr, I, Xe, At, and Rn.

1. *Elements*: For the purpose of classification an element is specified as follows:
   A. For metallic elements, the limit of impurities is <0.20 percent for each foreign constituent and <0.50 percent total impurities.
   B. For nonmetallic elements (i.e., carbon including graphite and diamond), the limit of impurities is ≤ 2.0 percent for each foreign constituent and ≤ 5.0 percent total impurities.
2. *Nonferrous Alloys*: This category is for alloys in which the major constituent is other than iron. For the purpose of classification, nonferrous alloys are specified as follows:
   A. Nonferrous Binary Alloys: The sum of the binary constituents is ≥ 99.50 percent and other constituents ≤ 0.20 percent each.
   B. Nonferrous Multiple Alloys: The sum of the first two constituents is <99.50 percent and/or any other constituent >0.20 percent. Alternatively, the major constituent is ≤ 99.50 percent and each of the other constituents <0.20 percent (or not given).
3. *Ferrous Alloys*: This category is for alloys in which iron is greater than or equal to any other constituent. For the purpose of classification, ferrous alloys are specified as follows:
   A. Carbon Steels: Carbon ≤ 2.0 percent and carbon $\geq$ any other alloying constituent.
      a. Group I: Every other alloying constituent is ≤ 0.20 percent except for Mn, P, S, Si, which may be ≤ 0.60 percent each.
      b. Group II: At least one other alloying constituent >0.20 percent and/or any of Mn, P, S, Si >0.60 percent.
   B. Cast Irons: Carbon >2.0 percent and carbon $\geq$ any other alloying constituent.
      a. Group I: Every other alloying constituent ≤ 0.20 percent except for Mn, P, S, Si, which may be ≤ 0.60 percent each.
      b. Group II: At least one other alloying constituent >0.20 percent and/or any of Mn, P, S, Si >0.60 percent.
   C. Alloy Steels (including alloy cast iron): The major alloying constituent is other than carbon.
      a. Group I: Every other alloying constituent ≤ 0.20 percent except for Mn, P, S, Si, which may be ≤ 0.60 percent each, and C ≤ 2.0 percent.*
      b. Group II: At least one other alloying constituent >0.20 percent and/or any of Mn, P, S, Si >0.60 percent.*
4. *Nonmetallic Compounds and Their Mixtures and Solutions*: Ceramic materials such as oxides, bromides, carbides, carbonates, nitrides, silicates, etc., are included in this category. For the purpose of classification, they are specified as follows:
   A. For simple compounds and their solutions, the limit of impurities is ≤ 2.0 percent for each foreign constituent and ≤ 5.0 percent total impurities.

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* Exception is made when Mn, P, S, or Si is the major alloying constituent. For instance, in the case of $Fe + Mn + \Sigma X_i$ alloys the specifications corresponding to Groups I and II would be as follows:

a. Group I: Every other alloying constituent ≤ 0.20 percent except for P, S, Si, which may be ≤ 0.60 percent each, and C ≤ 2.0 percent.

b. Group II: At least one other alloying constituent >0.20 percent and/any of P, S, Si >0.60 percent.

In the above example, Mn has a higher weight percentage than any of P, S, or Si but does not necessarily have a weight percentage higher than 0.60 percent. Thus, the limits of Mn percentage may be written:

$$Fe \geq Mn > P, S, Si \text{ and any other alloying constituent and } Mn \geq 0.20.$$

The same guideline is applied to ferrous alloys containing P, S, or Si as major alloying constituents.

B. For mixtures of simple compounds and their solutions, the major constituent is <95.0 percent, or any other constituent is >2.0 percent.

5. *Intermetallics*: An intermetallic is a metal-metal compound formed by metallic elements in a fixed simple atomic ratio. For the purpose of classification, specifications are the same as those for Class 4.
6. *Cermets*: Cermets are ceramic materials such as carbides, oxides, etc., fused with or bonded by one or more pure metals. However, there are also metal-metal cermets, metal-intermetallic cermets, etc., which are also included in this category.
7. *Polymers*: Polymers are chemical compounds or mixtures of compounds formed by polymerization and consisting essentially of repeating molecular structural units.
8. *Composite Systems*: A composite system may consist of materials in combination, with clearly defined boundaries existing between components of the system, or a homogeneous material having a distinct configuration.

For the reader's convenience, the classification scheme for Classes 1 through 4, described above, is summarized in the following table.

SUMMARY TABLE OF TPRC CLASSIFICATION OF MATERIALS

Classification — **Limits of Composition (weight percent)**

Classification		X_1	$X_1 + X_2$	X_2	X_3
1. ELEMENTS	A. METALLIC	>99.50	--	<0.20	<0.20
	B. NONMETALLIC	≥95.0	--	≤2.0	≤2.0
2. NONFERROUS ALLOYS ($X_1 >$ Fe)	A. BINARY ALLOYS	--	≥99.50	≥0.20	≤0.20
	B. MULTIPLE ALLOYS	--	≥99.50	>0.20	>0.20
		--	<99.50	≥0.20	≤0.20
		--	<99.50	>0.20	>0.20
		≤99.50	--	<0.20	<0.20

Classification			X_1	X_2	X_3	Mn, P S or Si
3. FERROUS ALLOYS (X_1 = Fe ≥ X_2)	A. CARBON STEELS	GROUP I	Fe	C ≤2.0	≤0.20	≤0.60
		GROUP II	Fe	C ≤2.0	≤0.20	>0.60
			Fe	C ≤2.0	>0.20	≤0.60
			Fe	C ≤2.0	>0.20	>0.60
	B. CAST IRONS	GROUP I	Fe	C >2.0	≤0.20	≤0.60
		GROUP II	Fe	C >2.0	≤0.20	>0.60
			Fe	C >2.0	>0.20	≤0.60
			Fe	C >2.0	>0.20	>0.60
	C. ALLOYS* STEELS	GROUP I	Fe	≠C	≤0.20 and C ≤2.0	≤0.60
		GROUP II	Fe	≠C	≤0.20	>0.60
			Fe	≠C	>0.20	≤0.60
			Fe	≠C	>0.20	>0.60

4. NONMETALLIC COMPOUNDS AND THEIR MIXTURES AND SOLUTIONS

Classification	X_1	X_2
A. SIMPLE COMPOUNDS AND THEIR SOLUTIONS	≥95.0	≤2.0
B. MIXTURES OF SIMPLE COMPOUNDS AND THEIR SOLUTIONS	<95.0	≤2.0
	≥95.0	>2.0
	<95.0	>2.0

NOMENCLATURE:

X_1 = Major Constituent

X_2 = Second Highest Constituent

X_3 = Third Highest Constituent

Where: $X_1 \geq X_2 \geq X_3 \geq X_4 \geq \cdots\cdots$

*In case Mn, P, S, or Si represents X_2 this particular element is dropped from the last column.

III. PRESENTATION OF DATA

Each of the six volumes consists of seven sections arranged in the following order:

1. Preface
2. Table of Contents
3. Explanatory Text
4. Conversion Factors
5. Body of Data
6. References
7. Material Index.

In the following paragraphs a detailed description of Sections 5, 6, and 7 is given. The contents of the first four sections are self-explanatory.

BODY OF DATA

Data on each material are presented in graphical or tabular form for selected sets of measurements, and are accompanied by a Reference Information Table with corresponding specifications and remarks. The first five properties listed in Section I of this Explanatory Text are considered as *point values* and are grouped together in a single table in the same manner as the graphs for the other remaining properties. Furthermore, for a given material group, where several properties are reported, data are arranged in accordance with the order of the property list given in Section I of this text.

Graphic Presentation

Data extracted from various references on a given material and property are shown on a single graph by means of distinct plotting symbols, which are identified in the Reference Information Table on the page following the graph. Each set of symbols indicates the data of a given investigator, but does not necessarily imply actual measured points. In numerous instances authors present only smoothed values, either in graphical or tabular form, and it is frequently impossible to distinguish interpolated or smoothed values from actual observed data.

In reporting data on thermal linear expansion, investigators sometimes give a single average value of this property for a considerable temperature range. In such instances it is assumed that a linear relationship is implied. All data on thermal linear expansion were reduced to a datum of 293°K (20°C); i.e., $(\Delta L/L) = 0$ at 293°K (20°C). This point is identified by a cross (+) on each graph.

The definition of $(\Delta L/L)$ used in this work is

$$(\Delta L/L) = \frac{L_T - L_{293}}{L_{293}} \times 100$$

where L_T = length of specimen at temperature T.

L_{293} = length of specimen at 293°K (20°C).

To compute the "coefficient" of thermal linear expansion β from 293°K to any temperature T, the following relation may be used.*

$$\beta = \frac{1}{100\,(T - 293)}\frac{\Delta L}{L}\text{, in } K^{-1}$$

* It is necessary to divide the right-hand side of this equation by 100 because the graphical presentation of $(\Delta L/L)$ is in percent expansion from 293°K.

In some instances the coefficient of thermal linear expansion is reported in tabular form.

Curves drawn through the plotted points are the "most probable" curves based on the data shown. As additional information becomes available in the future, these recommendations may well be modified.

Point Value Table

Data extracted from various references are identified by distinct symbols in the same manner as data points on a graph. "Most probable" values are given either at the top of the table or are indicated in a footnote. These selections are usually made solely on the basis of the data presented. Sometimes these point values are also reported as a function of temperature or composition, in which case they are shown in graphical form and placed immediately following the tabular values.

Reference Information Table

A table giving the reference information associated with each set of data obtained in the graph immediately follows the graph. The table contains the following information:

1. Symbol. The plotting symbols are identical with and correspond to those used in the graph.
2. Reference. References are identified by hyphenated numbers which serve to locate the bibliographic citation in the section of References at the end of each volume. The initial two digits indicate the year of publication and the last digits identify the specific reference within the given year. In those instances where a reference does not carry a date, the letter symbol ND is used in place of the year of publication. Undated references are listed at the end of the list of References.
3. Temperature Range. Range covered by the data in a given paper or report.
4. Reported Error. The author's estimated accuracy (or precision).
5. Sample Specification. This column contains all pertinent available information about the test sample. This information consists of the following:
   a. Commercial trade name, chemical formula, etc., followed by manufacturer's name, if it is necessary for correct identification.
   b. Composition of the sample, expressed in weight percent. Unless otherwise stated, the percent sign is omitted.
   c. Physical characteristics of the material, such as a single crystal, polycrystalline, density, crystal structures, etc.
   d. Specimen designation by the author is given in brackets at the end of the citation.
6. Remarks. This column contains information on:
   a. Special process used in fabrication of the sample, such as being sintered, chill-cast, etc.
   b. Sample history, such as cold-worked, hot-pressed, annealed, etc.
   c. Conditions under which the specimen was investigated, environment, etc.
   d. Other pertinent remarks.

REFERENCES

The section on Reference gives complete bibliographic citations for all the references from which data were extracted. They are arranged chronologically by year of publication, and in arbitary sequence within any given year.

For the preparation of the references, the following order and convention is used.

Periodicals

1. Author(s) name: Last name first, followed by initials.
2. Journal name: Standard TPRC journal name abbreviations are used.
3. Series, volume, and number.

a. If the series is represented by a letter, it is underlined together with the volume number.

b. If the series is represented by a number, then only the numeral representing the volume is underlined.

c. The numeral for the issue number is shown in parentheses.

4. Pages: Indicate the beginning and ending pages.

Reports

1. Author(s) name is given in the same form as for periodicals.
2. The name of the responsible organization, if any.
3. The name of sponsor.
4. Report, bulletin, or circular designation.
5. Number.
6. Part.
7. Pages (same as for periodicals).
8. AD and PB numbers or equivalents.

Books

The bibliographic citation for books lists: author(s), title, volume, edition, publisher, and page(s).

In general, private communications are not listed as references. However, if TPRC did obtain additional substantive information from an author through private communication, and if this information was used, the remark "additional data obtained from author(s)" is added at the end of the reference citation.

MATERIAL INDEX

The Material Index lists all the materials included in this work by their proper trade or commercial names arranged in alphabetical order and, for materials designated by number codes, the listing is in increasing numerical order. Location of information on a particular property for a particular material is specified by the volume number and page numbers indicated within the appropriate property column of the index. The page number always indicates the starting page of the graphs or point value tables. Chemical formulas are given in parentheses following the proper names of materials which can be chemically identified. However, for materials within a general group, e.g., different oxides of cerium, the entries are only by chemical formulas listed under the material group designation, such as "cerium oxides." Whenever applicable, an effort is made to list commercial materials under their several accepted names. In the case of broad classes of materials, such as steels, glasses, etc., the materials are listed under their common names as well as under the heading of their general class when the designation is merely a letter and number code.

Simpler inorganic compounds (e.g., aluminum oxide, tantalum boride) are named according to the convention given in the *Handbook of Chemistry and Physics* (The Chemical Rubber Co., 45th edition, 1964, and—if not available there—the 43rd edition, 1962). Other inorganic compounds are generally named in accordance with the convention given in the *Chemical Abstracts* by giving the more electropositive part of the name first and the more electronegative part second. For nonferrous and ferrous alloys, only the first two components are listed and ΣX_i is added to designate multiple alloys. An exception is made, however, for chromium-nickel and nickel-chromium ferrous alloys, in which cases, all three major constituents are listed. For other inorganic compounds and their mixtures and solutions, all components with weight percent greater than 2 percent are listed. Finally, for cermets, the name of the ceramic part is given first and the metal part second, each in their respective alphabetical order regardless of their weight percentages, with the exception of beryllium cermet (e.g., Beryllium YB-9052), in which case the name of the metal part is given first.

CONVERSION FACTORS

NOTE: In preparing the conversion factors, the following basic definitions were used:

1 in. = 2.54 cm*

1 lb. = 453.59237 g*

1 cal_{Th} = 4.184 (exactly) Joule*

1 cal_{IT} = 4.1868 (exactly) Joule*

1 $Btu_{IT} lb^{-1} F^{-1}$ = 1 $cal_{IT} g^{-1} C^{-1}$‡

The subscripts "Th" and "IT" denote "Thermochemical" and "International Steam Table" units, respectively.

* *NBS Technical News Bulletin*, 47(10), 1963.
‡ Mueller, E. F., and Rossini, F. D., *Am. J. Physics*, 12(1), 4, 1944.

CONVERSION FACTORS FOR UNITS OF DENSITY

MULTIPLY ↓ by appropriate factor to OBTAIN →	$g\ cm^{-3}$	$g\ in.^{-3}$	$kg\ m^{-3}$	$kg\ ft^{-3}$	$lb\ in.^{-3}$	$lb\ ft^{-3}$
$g\ cm^{-3}$	1	1.63872×10	1.0×10^{3}	2.83170×10	3.61275×10^{-2}	6.24283×10
$g\ in.^{-3}$	6.10234×10^{-2}	1	6.10234×10	1.72800	2.20462×10^{-3}	3.80959
$kg\ m^{-3}$	1.0×10^{3}	1.63872×10^{-2}	1	2.83170×10^{-2}	3.61275×10^{-5}	6.24283×10^{-2}
$kg\ ft^{-3}$	3.53146×10^{-2}	5.78704×10^{-1}	3.53145×10	1	1.27582×10^{-3}	2.20462
$lb\ in.^{-3}$	2.76797×10	4.53592×10^{2}	2.76797×10^{4}	7.83808×10^{2}	1	1.72800×10^{3}
$lb\ ft^{-3}$	1.60184×10^{-2}	2.62496×10^{-1}	1.60184×10	4.53592×10^{-1}	5.78704×10^{-4}	1

CONVERSION FACTORS FOR UNITS OF LATENT HEAT

MULTIPLY ↓ by appropriate factor to OBTAIN →	$cal_{Th}g^{-1}$	$cal_{IT}g^{-1}$	$W\ sec\ g^{-1}$	$J_{Int}g^{-1}$	$Btu_{Th}lb^{-1}$	$Btu_{IT}lb^{-1}$
$cal_{Th}g^{-1}$	1	9.99331×10^{-1}	4.184	4.18331	1.8	1.79880
$cal_{IT}g^{-1}$	1.00067	1	4.1868	4.18611	1.80120	1.8
$W\ sec\ g^{-1}$	2.39006×10^{-1}	2.38846×10^{-1}	1	9.99835×10^{-1}	4.30210×10^{-1}	4.29923×10^{-1}
$J_{Int}g^{-1}$	2.39046×10^{-1}	2.38886×10^{-1}	1.00017	1	4.30281×10^{-1}	4.29994×10^{-1}
$Btu_{Th}lb^{-1}$	5.55556×10^{-1}	5.55184×10^{-1}	2.32444	2.32406	1	9.99331×10^{-1}
$Btu_{IT}lb^{-1}$	5.55927×10^{-1}	5.55556×10^{-1}	2.326	2.32562	1.00067	1

CONVERSION FACTORS FOR UNITS OF SPECIFIC HEAT

MULTIPLY ↓ by appropriate factor to OBTAIN →	$cal_{Th}g^{-1}C^{-1}$	$cal_{IT}g^{-1}C^{-1}$	W sec $g^{-1}K^{-1}$	$J_{Int}g^{-1}K^{-1}$	$Btu_{Th}lb^{-1}F^{-1}$	$Btu_{IT}lb^{-1}F^{-1}$
$cal_{Th}g^{-1}C^{-1}$	1	9.99331×10^{-1}	4.184	4.18331	1	0.99331×10^{-1}
$cal_{IT}g^{-1}C^{-1}$	1.00067	1	4.1868	4.18611	1.00067	1
W sec $g^{-1}K^{-1}$	2.390006×10^{-1}	2.38846×10^{-1}	1	0.99836×10^{-1}	2.39006×10^{-1}	2.38846×10^{-1}
$J_{Int}g^{-1}K^{-1}$	2.39046×10^{-1}	2.38886×10^{-1}	1.00017	1	2.39046×10^{-1}	2.38886×10^{-1}
$Btu_{Th}lb^{-1}F^{-1}$	1	0.99331×10^{-1}	4.184	4.18331	1	9.99331×10^{-1}
$Btu_{IT}lb^{-1}F^{-1}$	1.00067	1	4.1868	4.18611	1.00067	1

Note: To convert quantities per "gram" to "mol" basis multiply conversion factor by the molecular weight M.

CONVERSION FACTORS FOR UNITS OF THERMAL CONDUCTIVITY

MULTIPLY by appropriate factor to OBTAIN →	$Btu_{IT} hr^{-1} ft^{-1} F^{-1}$	$Btu_{IT} in. hr^{-1} ft^{-2} F^{-1}$	$cal_{IT} sec^{-1} cm^{-1} C^{-1}$	$cal_{Th} sec^{-1} cm^{-1} C^{-1}$	$kcal_{Th} hr^{-1} m^{-1} C^{-1}$	$W cm^{-1} K^{-1}$
$Btu_{IT} hr^{-1} ft^{-1} F^{-1}$	1	1.2×10	4.13379×10^{-3}	4.13650×10^{-3}	1.48816	1.73073×10^{-2}
$Btu_{IT} in. hr^{-1} ft^{-2} F^{-1}$	8.33333×10^{-2}	1	3.44482×10^{-4}	3.44713×10^{-4}	1.24097×10^{-1}	1.44228×10^{-3}
$cal_{IT} sec^{-1} cm^{-1} C^{-1}$	2.41909×10^{2}	2.90291×10^{3}	1	1.00067	3.60241×10^{2}	4.1868
$cal_{Th} sec^{-1} cm^{-1} C^{-1}$	2.41747×10^{2}	2.90096×10^{3}	9.99331×10^{-1}	1	3.6×10^{2}	4.184
$kcal_{Th} hr^{-1} m^{-1} C^{-1}$	6.71969×10^{-1}	8.06363	2.77592×10^{-3}	2.77778×10^{-3}	1	1.16222×10^{-2}
$W cm^{-1} K^{-1}$	5.77789×10	6.93347×10^{2}	2.38846×10^{-1}	2.39006×10^{-1}	8.60421×10	1

CONVERSION FACTORS FOR UNITS OF THERMAL DIFFUSIVITY

MULTIPLY ↓ by appropriate factor to OBTAIN →	cm^2sec^{-1}	cm^2hr^{-1}	m^2hr^{-1}	$in.^2sec^{-1}$	ft^2sec^{-1}	ft^2hr^{-1}
cm^2sec^{-1}	1	3.60×10^3	3.60×10^{-1}	1.550×10^{-1}	1.07639×10^{-3}	3.87501
cm^2hr^{-1}	2.77778×10^{-4}	1	1.0×10^{-4}	4.30556×10^{-5}	2.98998×10^{-7}	1.07639×10^{-3}
m^2hr^{-1}	2.77778	1.0×10^4	1	4.30556	2.98998×10^{-3}	1.07639×10
$in.^2sec^{-1}$	6.45160	2.32258×10^4	2.32258	1	6.94444×10^{-3}	2.50×10
ft^2sec^{-1}	9.29030×10^2	3.34451×10^6	3.34451×10^2	1.440×10^2	1	3.60×10^3
ft^2hr^{-1}	2.58064×10^{-1}	9.29030×10^2	9.29030×10^{-2}	4.0×10^{-2}	2.77778×10^{-4}	1

CONVERSION FACTORS FOR UNITS OF VAPOR PRESSURE

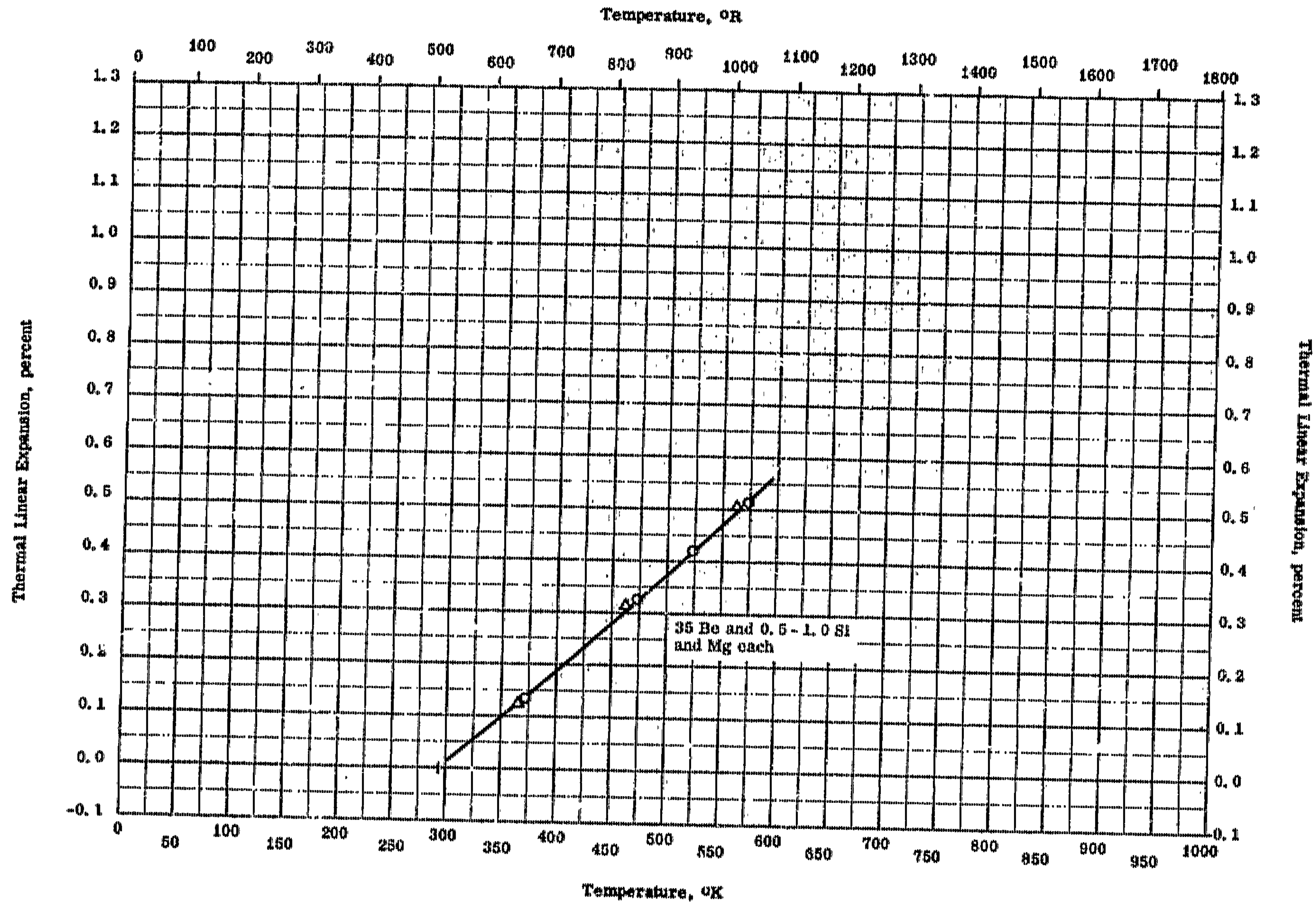
MULTIPLY ↓ by appropriate factor to OBTAIN →	dyne cm^{-2}	atm	kg cm^{-2}	mm Hg	in. Hg	lb in.$^{-2}$
dyne cm^{-2}	1	9.8690×10^{-7}	1.01970×10^{-6}	7.5010×10^{-4}	2.9530×10^{-5}	1.45040×10^{-5}
atm	1.01330×10^{6}	1	1.03320	7.60×10^{2}	2.9929×10	1.46960×10
kg cm^{-2}	9.8070×10^{5}	9.6780×10^{-1}	1	7.3560×10^{2}	2.8960×10	1.42230×10
mm Hg	1.33320×10^{3}	1.31580×10^{-3}	1.35950×10^{-3}	1	3.9370×10^{-2}	1.93370×10^{-2}
in. Hg	3.3860×10^{4}	3.3420×10^{-2}	3.4530×10^{-2}	2.540×10	1	4.9120×10^{-1}
lb in.$^{-2}$	6.89470×10^{4}	6.80460×10^{-2}	7.0310×10^{-2}	5.1710×10	2.0360	1

NONFERROUS ALLOYS

PART II

NONFERROUS MULTIPLE ALLOYS

(Sum of the first two constituents <99.50 percent and/or any other constituents >0.20 percent. Alternatively, major constituent ≤99.50 percent and each of the other constituents either <0.20 percent or not given.)



THERMAL LINEAR EXPANSION — ALUMINUM + BERYLLIUM + ΣX_i

THERMAL LINEAR EXPANSION — ALUMINUM + BERYLLIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	293-573		66.5 Al, 35 Be, and 0.5 - 1.0 Si, Mg each.	Forged, solution heat-treated at about 600 F, quenched, and aged at about 300 F; heating.
△	52-19	293-573		Same as above.	Cooling.

PROPERTIES OF ALUMINUM + COPPER + ΣX_i

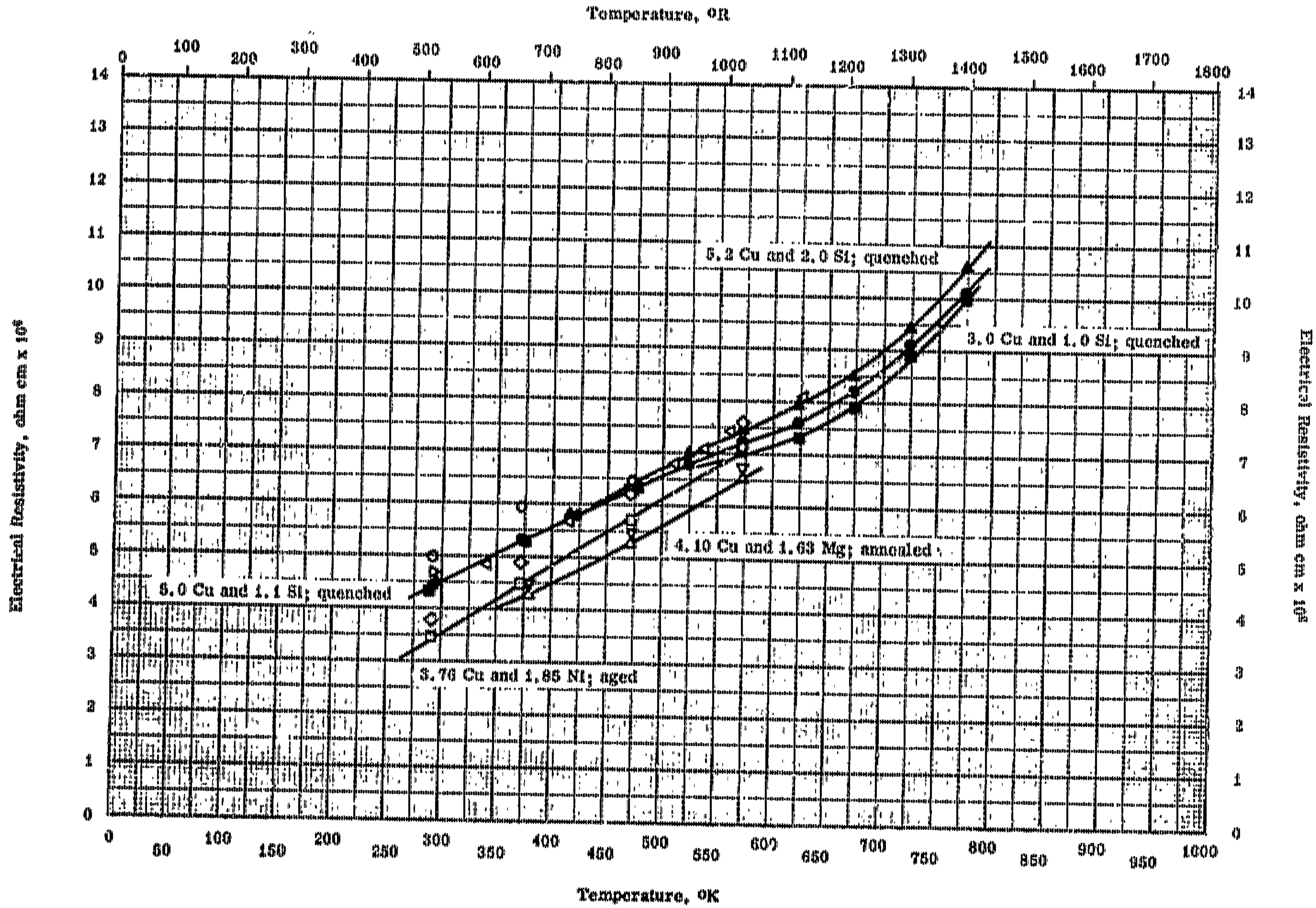
REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
○ 3.8-4.9 Cu and 1.2-1.8Mg	2.779	173.5
□ 10 Cu and 1.5 Ni	2.94	184
△ 3 Cu and 1.5 Fe	2.8	170
◇ 3 Cu and 1.5 Fe	2.8	170
● 4.5 Cu and 1.5 Mg	2.78	174
Melting Point:		
■ 10 Cu, 1.5 Ni and 1.0 Si	794	1430
▲ 3 Cu and 1.5 Fe	810	1459
◆ 3 Cu and 1.5 Fe	810	1459
▽ 4.2 Cu and 1.0-1.3 Si	785 ± 4	1414 ± 7
Heat of Fusion:	$cal\ g^{-1}$	$Btu\ lb^{-1}$
▼ 10 Cu and 1.5 Ni	93	167
◁ 3 Cu and 1.5 Fe	93	167

PROPERTIES OF ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	298		Alloy 2024-5-T4; nominal composition 3.8-4.9 Cu, 1.2-1.8 Mg, and 0.3-0.9 Mn.	Density by weight and volume by water displacement.
□	50-2	298		Alloy C-46; nominal composition: 10 Cu, 1.5 Ni, 1.0 Si, 0.25 Mn, and 0.15 Ti.	Heated 6-12 hrs at 500 C and quenched in water at 60-100 C.
■	50-2	795		Same as above.	Same as above.
▼	50-2	795		Same as above.	Same as above.
△	50-1	293		Duralite or Thermafond C3-INA; nominal composition: 3 Cu, 1.5 Fe, 0.7 Si, 0.6 Mg, 0.6 Ni, and 0.15 Ti.	Wrought, held 4-8 hrs at 360 C, cooled to 250 C, sheets heated 1/2 hrs at 520-530 (forging 4-6 hrs at 525 C), water tempered, aged 20 hrs at 160 C, and stabilized 2 hrs at 225 C.
▲	50-1	811		Same as above.	Same as above.
◇	50-1	293		Same as above.	Cast, held 4-8 hrs at 360 C, 4-20 hrs at 520-530 C, water-tempered, aged 20 hrs at 120 C, and stabilized 2 hrs at 225 C.
◆	50-1	811		Same as above.	Same as above.
◁	50-1	811		Same as above.	Same as above.
●	51-6	293		24S Al; nominal 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Condition T-4; density by weight in air and in water.
▽	51-15	786-790		4.2 Cu, 1.0-1.3 Si, 0.7 Fe, 0.6 Mn, and 0.36-0.97 Mg.	M.P. from dilatation curve with Bollenrath dilatometer; 4 samples with different amounts of Mg + Si.

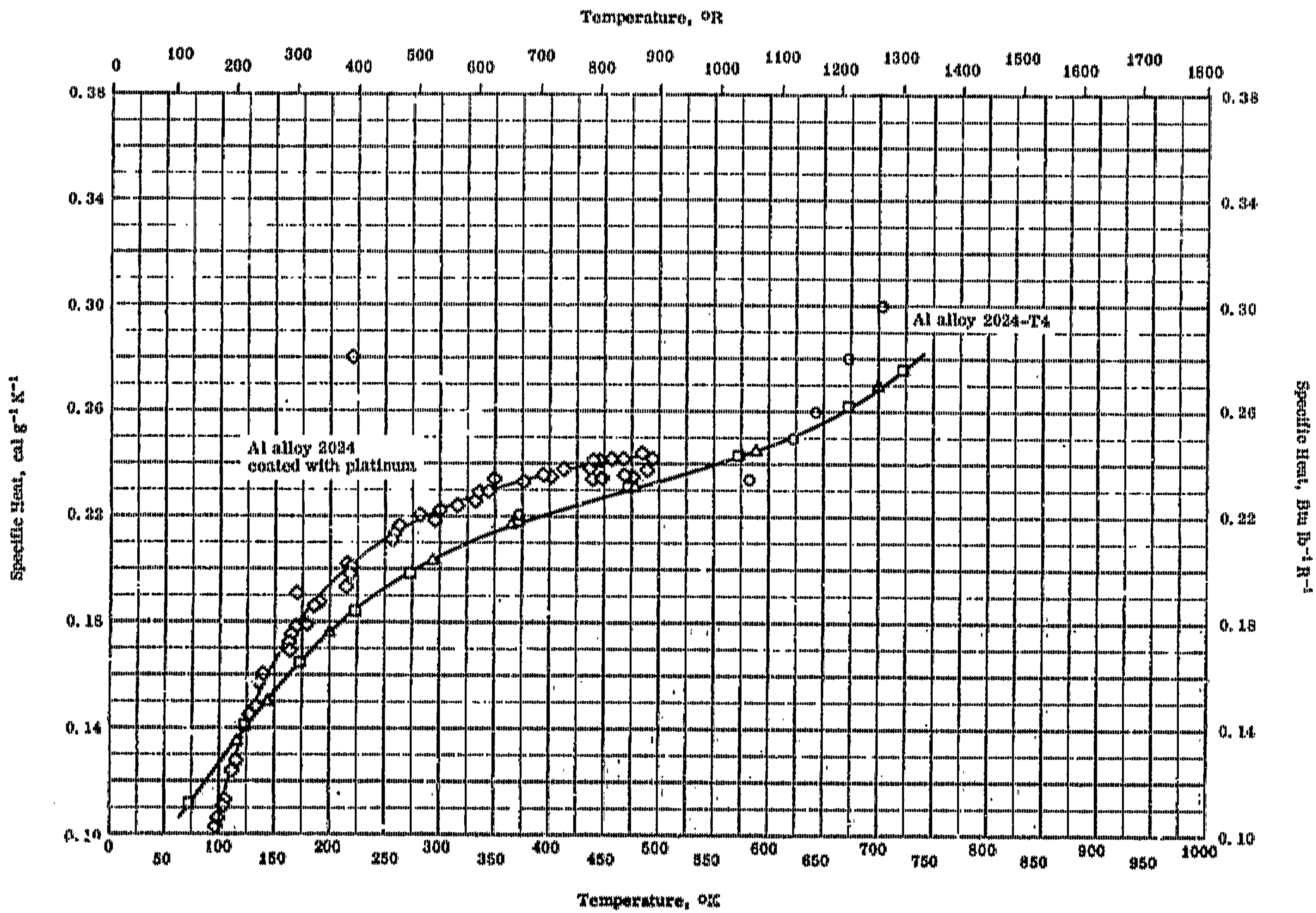


ELECTRICAL RESISTIVITY — ALUMINUM + COPPER + ΣX_i

ELECTRICAL RESISTIVITY — ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-573		Al Alloy "Y" (British design.); 3.76 Cu, 1.85 Ni, 1.34 Mg, 0.45 Si, and 0.40 Fe.	Wrought, as received.
□	49-2	293-573		Same as above.	Wrought, heated to 510 C, quenched in fairly hot water, and aged at room temperature.
△	51-4	381-576	±0.2	4.10 Cu, 1.03 Mg, 0.1 Fe, 0.06 Si, 0.05 Zn, 0.004 Ti, and traces of Mn.	Annealed 1 hr at 500 C, 23 hrs at 400 C, and 40 hrs at 300 C.
▽	51-4	381-576	±0.2	Same as above.	Same as above: cooling curve.
◁	51-4	343-626	±0.2	4.25 Cu, 1.59 Mg, 0.36 Fe, 0.16 Si, 0.02 Zn, 0.01 Mn, and 0.007 Ti.	Repeatedly heated to 300 C before test.
▷	49-2	293		Aluminum alloy RR59 (Brit. design.); 2.31 Cu, 1.46 Mg, 1.23 Fe, 1.20 Ni, 0.88 Si, and 0.07 Ti.	Wrought.
◇	49-2	293-573		Same as above.	Wrought, heated 3 hrs at 525 C, quenched, and held 16 hrs at 170 C and again quenched.
●	48-1	293-1073		5.02 Cu, 1.06 Si, 0.15 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg, Mn.	Cast, heated 6hrs at 970 F and water quenched.
▲	48-1	293-1073		5.24 Cu, 2.10 Si, 0.15 Fe, 0.05 Zn, 0.02 Ti and traces of Mg, Mn.	Same as above.
■	48-1	293-1073		3.0 Cu, 0.99 Si, 0.15 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg, Mn.	Same as above.

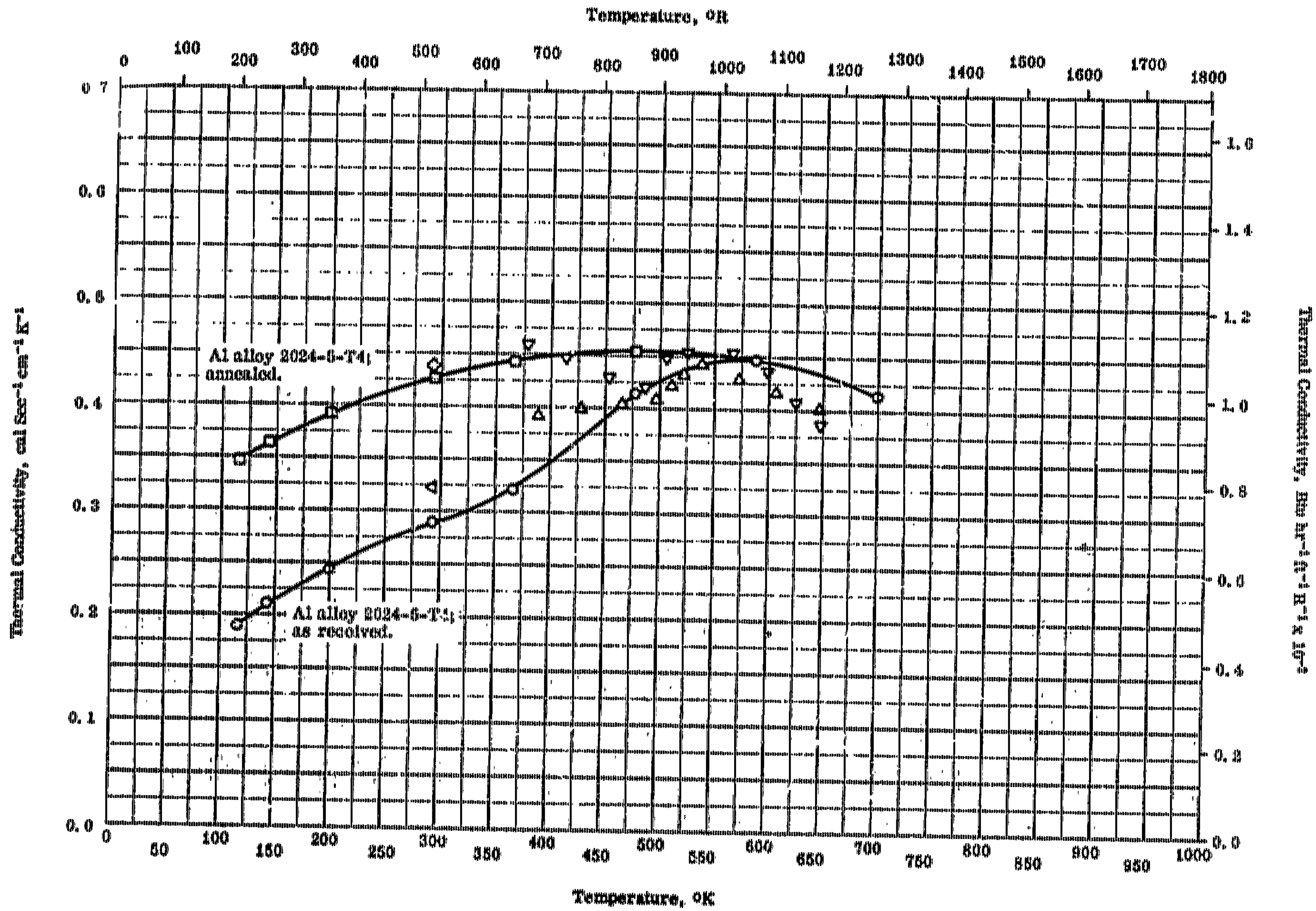


SPECIFIC HEAT -- ALUMINUM + COPPER + ΣX_i

SPECIFIC HEAT — ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-4	373-703		4.31 Cu, 0.20 Si, 0.14 Fe, and traces of other impurities.	Hot worked, annealed several hrs at 500 C in vacuum and cooled in 10 days; heating rate during test 2 C mm^{-1}.
□	54-13	78-733		Al alloy 24S-T4; 93.4 Al, 4.5 Cu, 1.5 Mg and 0.6 Mn.	
△	58-1	110-700		Al alloy 2024-T4; 93.4 Al, 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Sealed under helium atmosphere.
◇	62-15	97-402	≤5.0	90.0 Al, Al alloy 2024.	Hanova liquid platinum applied on specimen's front surface for opaqueness then painted with Parson black for constant absorptivity; Hanova liquid platinum coatings were applied also on specimen's rear surface for good conductive surface.

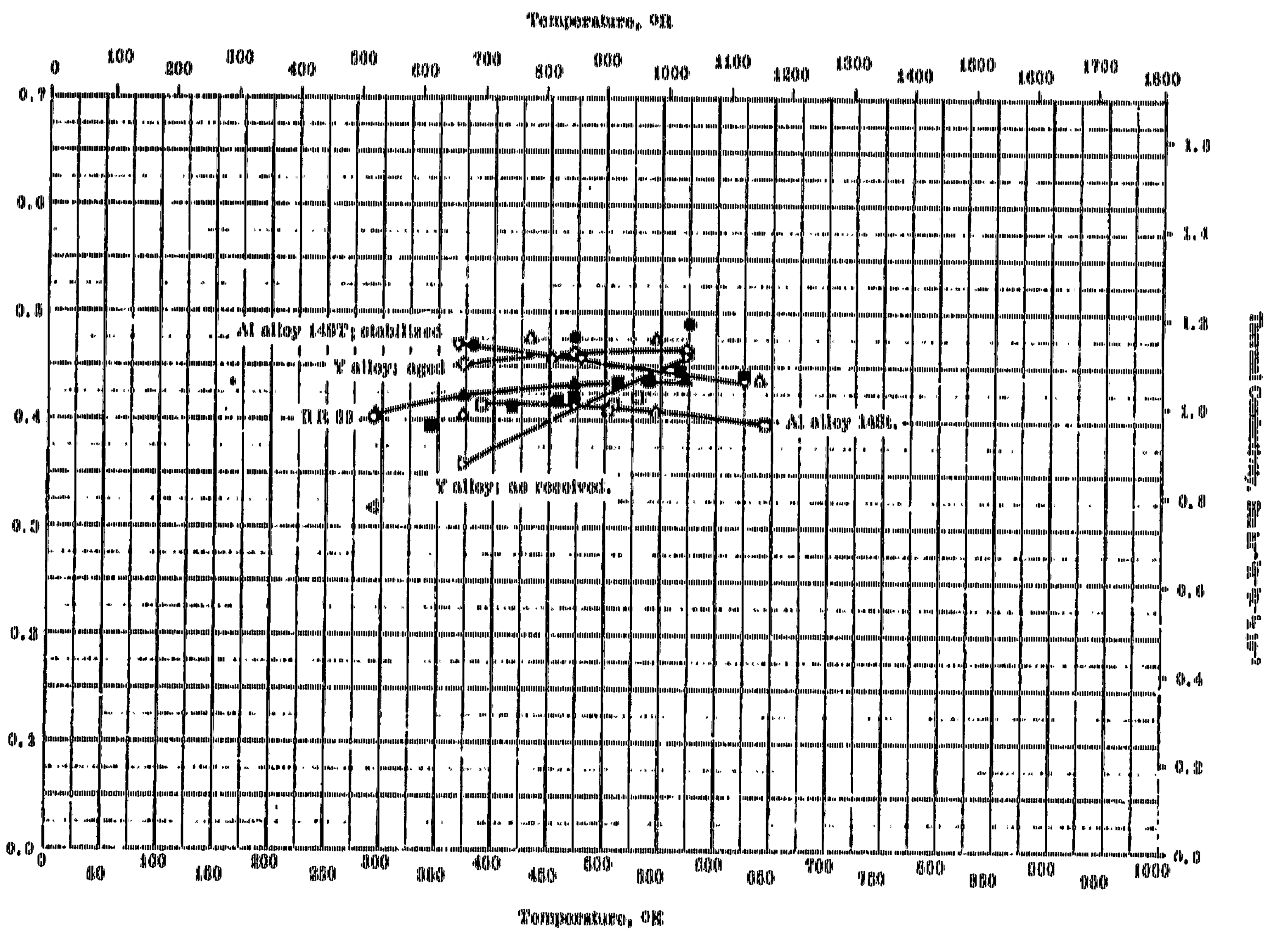


THERMAL CONDUCTIVITY — ALUMINUM + COPPER + ΣX$_i$
(Aluminum alloy 2024)

THERMAL CONDUCTIVITY — ALUMINUM + COPPER + ΣX$_i$
(Aluminum alloy 2024)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	88-1	117-700		Al alloy 2024-S-T4; 3.8-4.9 Cu, 1.2-1.8 Mg, 0.3-0.9 Mn; nominal composition; density 174 lb ft^{-3}.	As received.
□	88-1	117-700		Same as above.	Measured after heating to 575 F.
△	81-3	381-648	±4	Al alloy 24S; 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Heated from virgin conditions to max. temperature of 707 F.
▽	81-3	38[illegible]-[illegible]48	±4	Same as above.	The above sample cooled to room temperature and then repeated the above heat treatment.
◁	49-1	298	±5	Al alloy 24S.	Condition - T4 - T3.
◇	49-1	298	±5	Same as above.	Condition - O annealed.

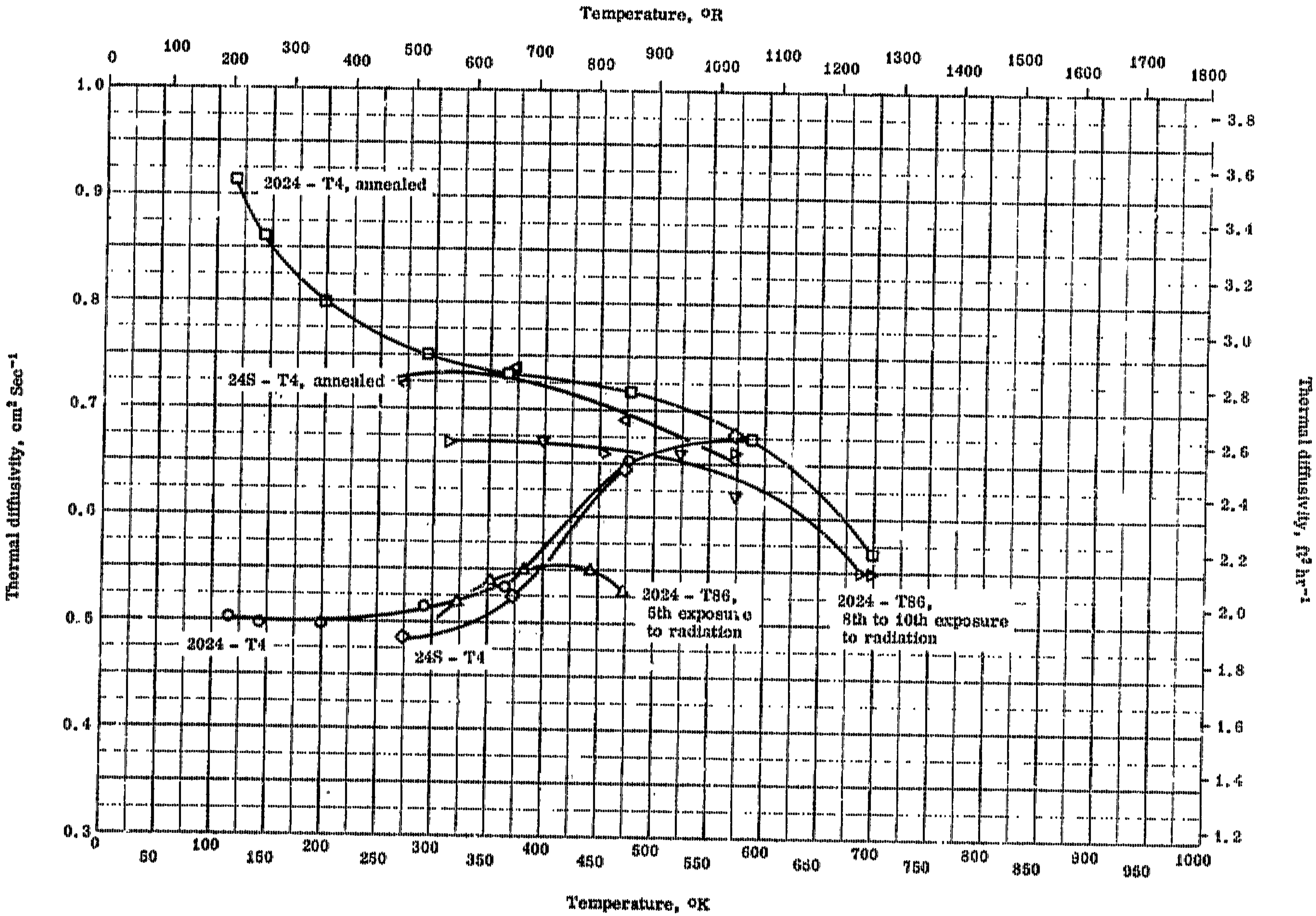


THERMAL CONDUCTIVITY -- ALUMINUM + COPPER + ΣXi

THERMAL CONDUCTIVITY — ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-[illegible]	293		Duralite or Thermafond C3 - INA; 3 Cu, 1.5 Fe, 0.7 Si, 0.6 Mg and Ni each, and 0.15 Ti.	Same results for cast and wrought samples.
□	51-3	367-645	± 4	Al alloy 14 ST: 4.4 Cu, 0.8 Si and Mn each, 0.4 Mg.	Heated from virgin condition to max. temperature of 700 F.
△	51-3	367-645	± 4	Same as above.	The above sample measured after cooling to room temperature.
▽	51-3	367-645	± 4	Same as above.	Stabilized for 50 hrs at 775 F.
◁	50-2	298		10 Cu, 1.5 Ni, 1 Si, 0.25 Mn, 0.15 Ti; density 184 lb ft^{-3}.	Pre-heated for 6 - 12 hrs at 500 C and water quenched.
▷	49-2	293-573		Aluminum alloy (Y alloy, British design.); 3.76 Cu, 1.86 Ni, 1.33 Mg, 0.45 Si, and 0.40 Fe.	As received.
◇	49-2	293-573		Same as above.	Heated to 511 C, quenched in hot water, and then aged at room temperature.
●	51-4	373-575	<±3	94.06 Al, 4.10 Cu, 1.63 Mg, 0.10 Fe, 0.06 Si, 0.05 Zn, 0.04 Ti, and trace Mn.	Annealed 1 hr at 500 C, 25 hrs at 400 C, and 40 hrs at 300 C.
■	51-4	343-626	<±3	93.60 Al, 4.25 Cu, 1.59 Mg, 0.25 Fe, 0.16 Si, 0.02 Zn, 0.01 Mn, and 0.007 Ti.	Repeatedly heated inside the apparatus until middle of the rod was at 300 C.
▲	49-2	289-575		RR 59, (British design.); 2.31 Cu, 1.46 Mg, 1.23 Fe, 1.20 Ni, 0.88 Si, and 0.07 Ti.	Heated 2 hrs at 525 C, quenched, and then heated 16 hrs at 170 C and again, quenched.

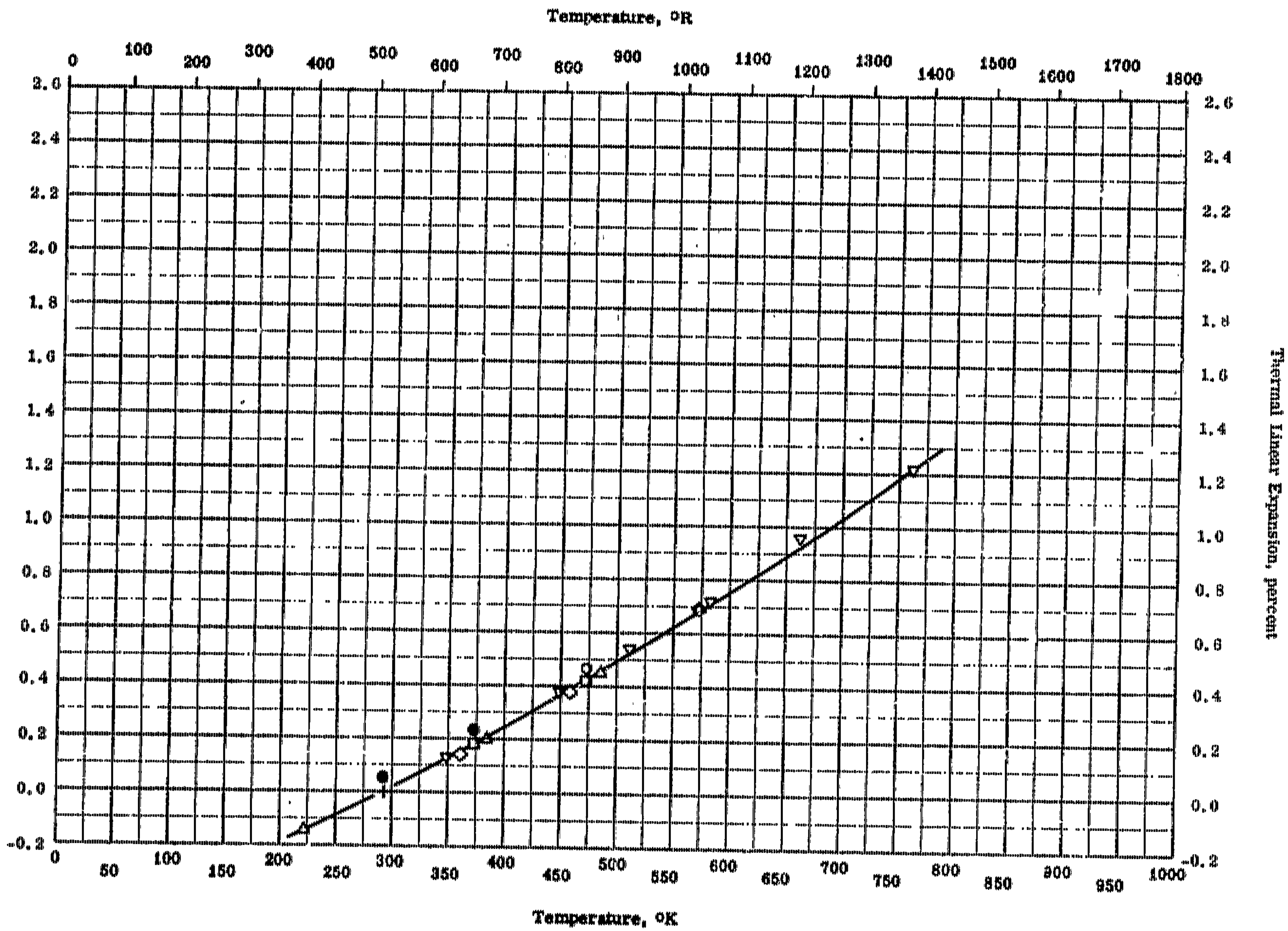


THERMAL DIFFUSIVITY -- ALUMINUM + COPPER + ΣX_i

THERMAL DIFFUSIVITY -- ALUMINUM + COPPER + ΣX$_i$

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	116-700		2024-T4; 4.5 Cu, 1.5 Mg, and 0.6 Mn.	As received.
□	58-1	116-700		Same as above.	The above sample heated above 575 F.
△	57-1	323-473		2024-T86; 3.8-4.9 Cu, 1.2-1.8 Mg, 0.3-0.9 Mn, 0.5 max Fe, 0.5 max Si, 0.25 max Zn, 0.1 max Cr, and 0.05 max each and 0.15 max others in total; composition from Metal's Handbook.	Measured after five exposures to radiation and followed by cooling.
▽	57-1	398-573		Same as above.	The above sample after eight exposures to radiation and followed by cooling.
▷	57-1	313-698		Same as above.	The above sample after ten exposures to radiation and followed by cooling.
◁	56-1	273-573		24 S; 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Annealed at 450 C.
◇	56-1	273-573		24 S-T 4; 4.5 Cu, 1.5 Mg, and 0.6 Mn.	

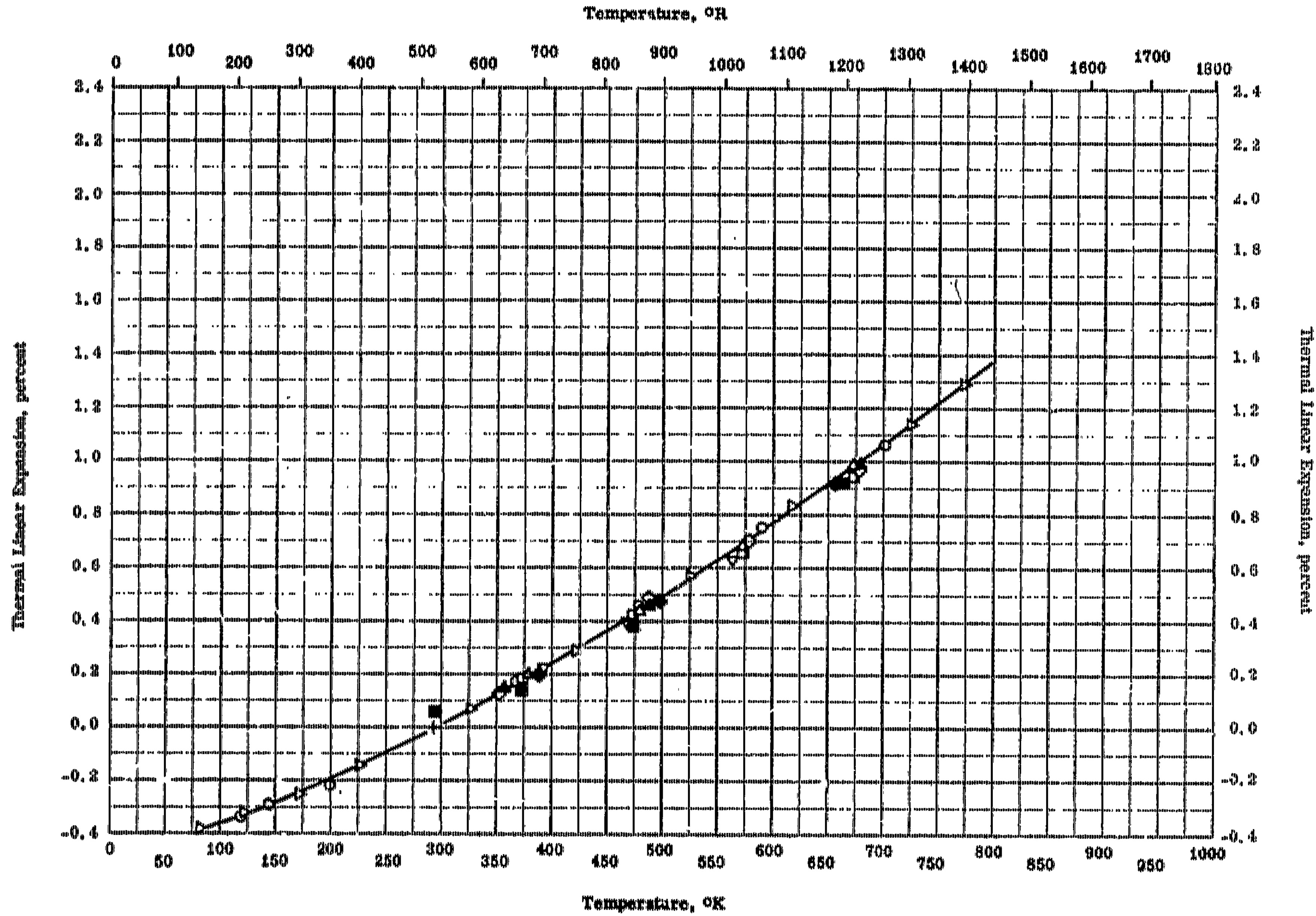


THERMAL LINEAR EXPANSION - ALUMINUM + COPPER + ΣX_i
(3 - 12 Cu and 0.4 - 1.5 Fe)

THERMAL LINEAR EXPANSION -- ALUMINUM + COPPER + ΣX_i
(3 - 12 Cu and 0.4 - 1.5 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	293-473		88.3 Al, 10.09 Cu, 1.14 Fe, 0.26 Mg, and 0.21 Si.	Heating.
●	52-19	293-473		Same as above.	Cooling.
□	52-19	293-473		Same as above.	Cast, heated to 750 F, and cooled vary slowly; heating and cooling curves are graphically identical.
△	52-19	223-573		89.3 Al, 9.0 Cu, 1.0 Fe, 0.4 Si, 0.3 Mg, and 0.03 Mn.	Cast, heated 20 hrs at 225 C, air-cooled.
	52-19	223-573		87.30 Al, 11.88 Cu, 0.43 Fe, and 0.39 Si.	Cast, heated to 500 C, cooled slowly, reheated to 300 C, cooled slowly; this sample and the following four samples gave both heating and cooling curves graphically identical to above.
	52-19	223-573		89.22 Al, 9.95 Cu, 0.44 Fe, and 0.39 Si.	Treatment same as above.
	52-19	223-573		91.13 Al, 7.87 Cu, 0.45 Fe, 0.33 Si, and 0.22 Mn.	Same as above.
	52-19	223-573		91.14 Al, 7.68 Cu, 0.46 Fe, 0.39 Si, and 0.33 Mn.	Same as above.
	52-19	223-573		93.41 Al, 5.81 Cu, 0.42 Fe, and 0.36 Si.	Same as above.
◇	50-1	293-573		Duralite or Thermafond C3-INA; 3 Cu, 1.5 Fe, 0.7 Si, 0.6 Mn, Ni each, and 0.15 Ti; density 170 lb ft^{-3}.	Cast, hold 4-8 hrs at 360 C, 4-20 hrs at 520-530 C, water quenched, and aged 20 hrs at 120 C, 2 hrs at 225 C.
▽	43-9	293-773		17 ST Al; nominal: 3.5 - 4.5 Cu, 1 Fe, 0.4 - 1.0 Mn, 0.8 Si, 0.2 - 0.8 Mg, 0.25 Zn, and 0.1 Cr.	

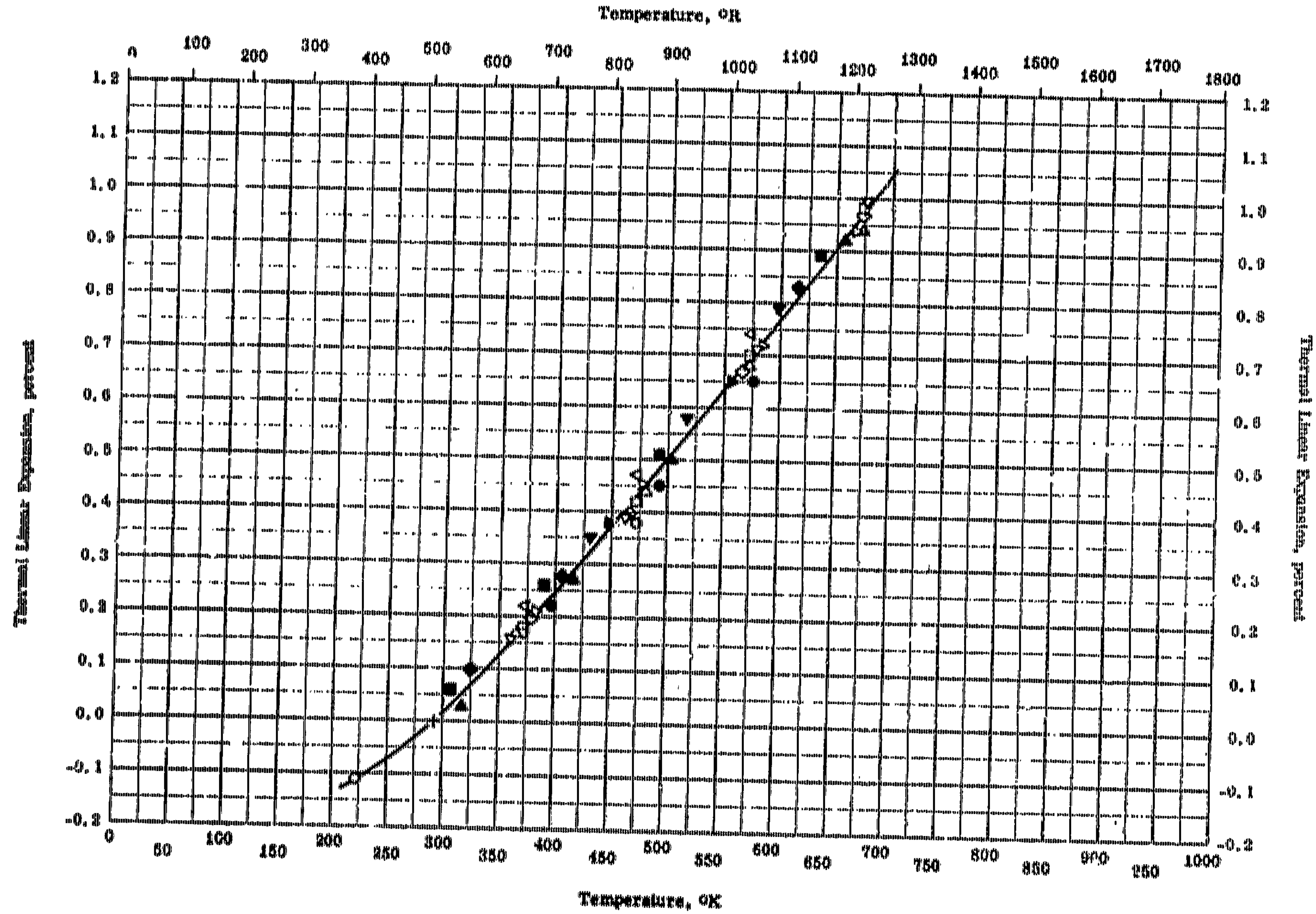


THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + ΣX_i
(3 - 5 Cu and 1 - 2 Mg)

THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + ΣX_i
(2 - 5 Cu and 1 - 2 Mg)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	130-700		Al alloy 2024-5-T4; nominal: 3.8 - 4.9 Cu, 1.2 - 1.8 Mg, and 0.3 - 0.9 Mn.	Tested in vacuum.
□	52-19	293-673		93.09 Al, 4.41 Cu, 1.41 Mg, 0.67 Mn, 0.25 Fe, 0.10 Si, 0.02 Zn, and 0.01 Ni, Cr, Pb, Bi each.	Solution heat-treated 1 hr at 920 F, water quenched, and aged at room temperature; heating.
■	52-19	293-673		Same as above.	Cooling.
△	52-19	293-673		Same as above.	Same treatment as above; then aged 100 hrs at 700 F; heating.
▲	52-19	293-673		Same as above.	Cooling.
◇	52-19	293-673		Same as above.	Same treatment as above; then aged 500 hrs at 800 F; heating.
◆	52-19	293-673		Same as above.	Cooling.
▽	40-2	373-573		Aluminum Alloy RR60 (British desig.) 2.31 Cu, 1.46 Mg, 1.23 Fe, 1.20 Ni, 0.88 Si, and 0.07 Ti.	Wrought, heated 2 hrs at 525 C, quenched, aged 16 hrs at 170 C, quenched.
▷	51-6	63-773		Aluminum alloy 24S; nominal: 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Condition T4; tested at 1.5 - 2.5 C min^{-1} rise in argon.



THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + EX_i
(3 - 10 Cu and 1 - 8 Ni)

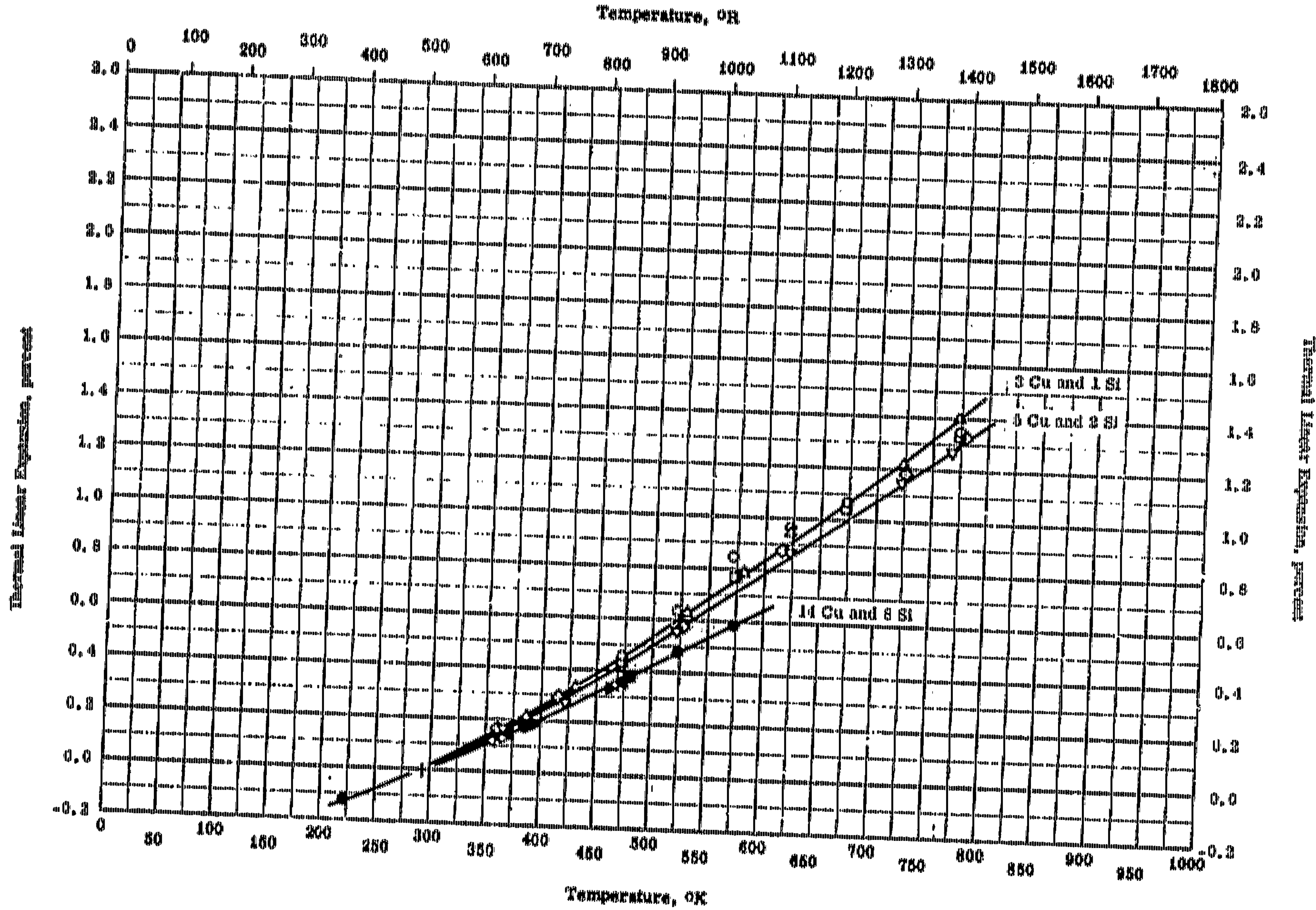
THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + ΣX_i
(3 - 10 Cu and 1 - 8 Ni)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	83-10	293-473		77.00 Al, 7.21 Cu, 7.18 Ni, 0.78 Si, and 0.84 Fe.	Annealed.
□	82-10	293-673		92.33 Al, 3.08 Cu, 2.01 Ni, 0.64 Mg, 0.58 Si, 0.46 Fe, 0.05 Mn, 0.03 Zn, and 0.01 Cr, Pb, Bi, Ti each.	Solution heat-treated 1 hr at 900 F, water quenched, and aged 10 hrs at 340 F; heating.
■	83-10	293-673		Same as above.	Cooling.
△	83-10	293-673		Same as above.	Sa reatment as above, then aged 100 hrs at 700 F; heating.
▲	83-10	293-673		Same as above.	Cooling.
◇	83-10	293-673		Same as above.	Same treatment as above, then aged 500 hrs at 800 F; heating.
◆	83-10	293-673		Same as above.	Cooling.
▽	83-10	293-673		91.50 Al, 3.89 Cu, 2.14 Ni, 1.43 Mg, 0.58 Si, 0.31 Fe, 0.03 Ti, 0.03 Zn, 0.01 Mn, Cr, Pb, Bi each.	Same treatment as above; then aged 10 hrs at 340 F; heating.
▼	83-10	293-673		Same as above.	Cooling.
▷	83-10	293-673		Same as above.	Same treatment as above; then aged 10 hrs at 700 F; heating.
▶	83-10	293-673		Same as above.	Cooling.
◁	60-2	293-573		Al alloy No. C-46; 10 Cu, 1.5 Ni, 1 Si, 0.28 Mn, and 0.16 Ti; density 184 lb ft^{-3}.	Preheated 6 - 12 hrs at 500 C; water quenched.
				(Continued onto next page)	

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
●	40-2	373-873		Aluminum "Y" alloy (British Design.); 3.76 Cu, 1.88 Ni, 1.33 Mg, 0.48 Si, and 0.40 Fe.	Plotted data average of two samples (within ± 0.5%): (a) Wrought (b) Heated 510 C, quenched in hot water, and aged at room temperature.

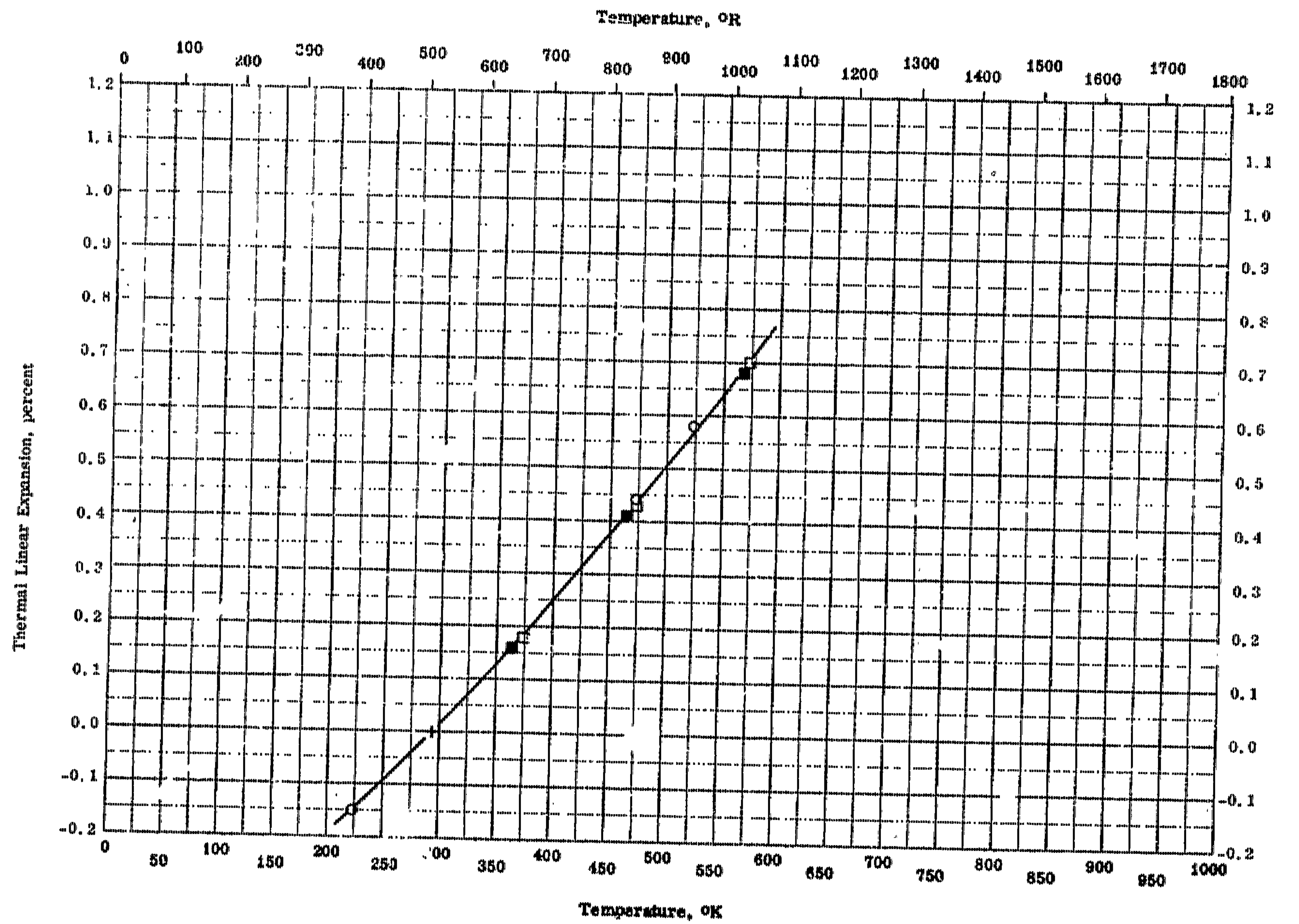


THERMAL LINEAR EXPANSION -- ALUMINUM + COPPER + ΣX_i
(3 - 14 Cu and 0.8 - 10 Si)

THERMAL LINEAR EXPANSION -- ALUMINUM + COPPER + ΣX_i
(3 - 14 Cu and 0.9 - 10 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, K	Rept. Error %	Sample Specifications	Remarks
○	48-1	293-773		3.08 Cu, 1.06 Si, 0.16 Fe, 0.05 Zn, 0.03 Ti, and traces of Mg, Mn.	Cast, hold 6 hrs at 520 C, and water quenched; heating rate 1.6 C per min; initial test.
□	48-1	293-773		Same as above.	Second heating.
▽	48-1	293-773		8.04 Cu, 3.10 Si, 0.18 Fe, 0.05 Zn, 0.08 Ti, and traces of Mg, Mn.	Cast, hold 6 hrs at 520 C, and water quenched; heating rate 1.6 C per min; initial test.
◇	48-1	293-775		Same as above.	Second heating.
△	48-1	293-773		9.00 Cu, 0.90 Si, 0.16 Fe, 0.05 Zn, 0.03 Ti, and traces of Mg, Mn.	Cast, hold 6 hrs at 520 C, and water quenched; heating rate 1.6 C per min.
▷	88-10	293-473		9.88 Cu, 9.70 Si, 4.03 Ni, and 0.80 Fe.	Cast in iron mold; heating.
▶	88-10	293-473		Same as above.	Cooling data of above specimen.
◁	88-10	293-473		Same as above.	Heated to 400 C, cooled very slowly; heating.
◀	88-10	293-473		Same as above.	Cooling data of above specimen.
●	38-10	293-873		14.14 Cu, 0.91 Si, and 0.01 Fe.	Normalized 1 hr at 400 C and cooled slowly.

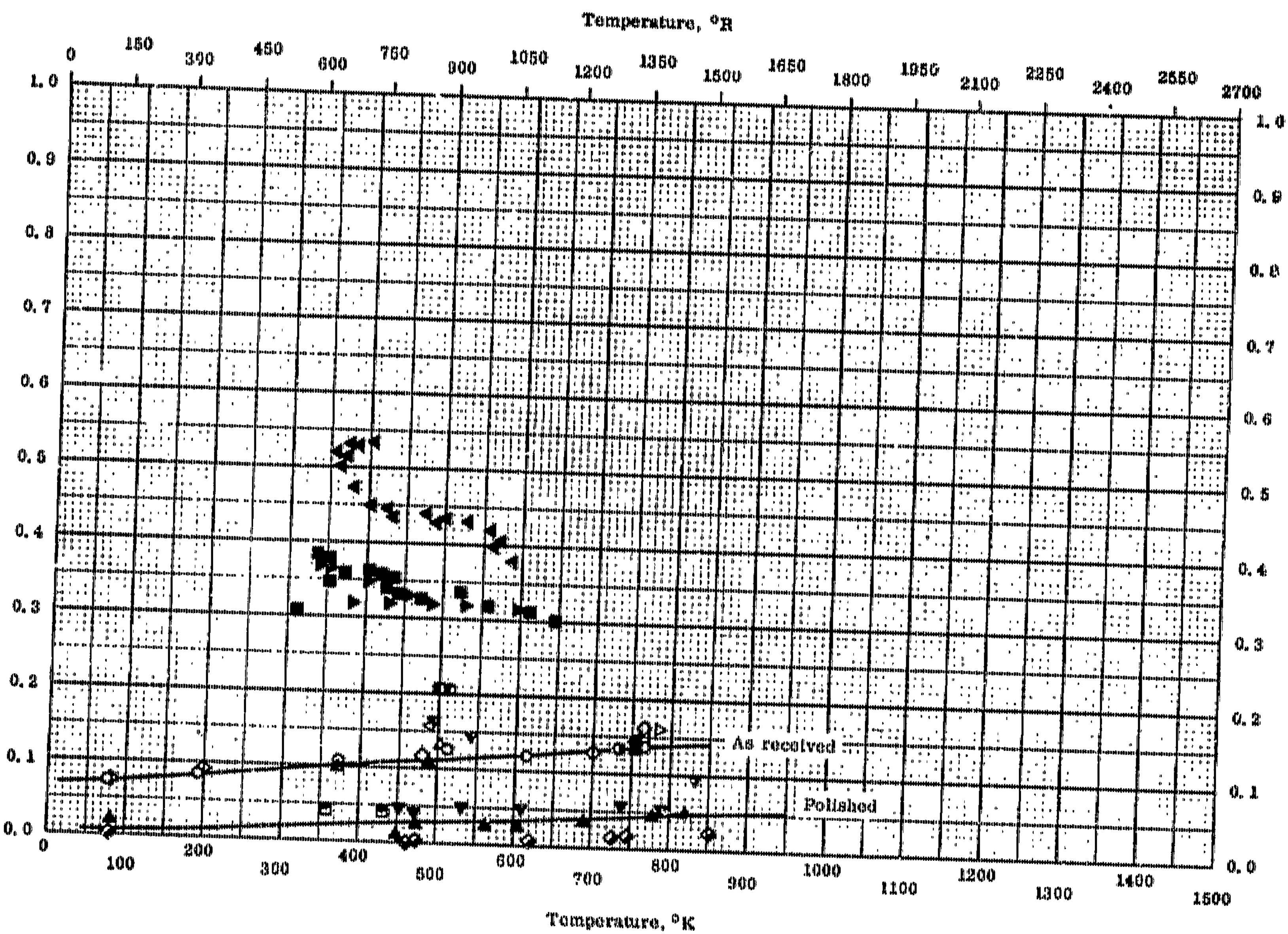


THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + ΣX_i
(1.8 Cu and 1.3 Sn)

THERMAL LINEAR EXPANSION — ALUMINUM + COPPER + ΣX_i
(1.8 Cu and 1.3 Sn)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	223-522		94.0 Al, 1.8 Cu, 1.3 Sn, 1.1 Zn, 0.6 each Mg, Fe, 0.23 Ti, 0.2 each Cr, Si, and 0.02 Mn.	Sand cast.
□	52-19	223-573		Same as above.	Rolled, heated 2 hrs at 650 F, furnace-cooled; heating.
■	52-19	223-573		Same as above.	Cooling.



NORMAL TOTAL EMITTANCE — ALUMINUM + COPPER + ΣX_i

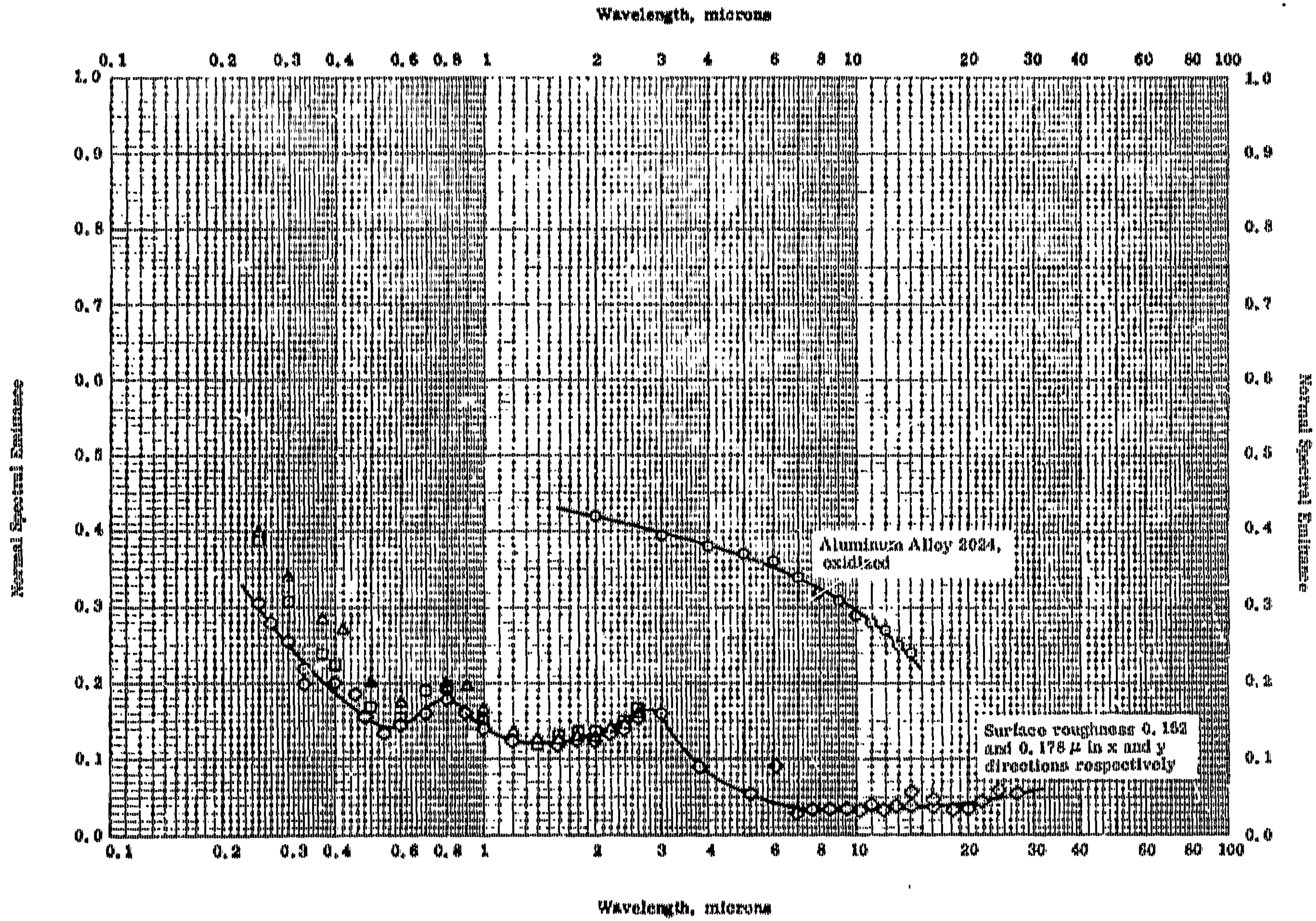
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-27	78-760		Aluminum alloy 24 ST; nominal composition: 4.5 Cu, 1.5 Mg, 0.6 Mn.	As received; wiped; measured in helium (10 microns); cycle 1 heating.
△	54-27	506		Same as above.	Cycle 1 cooling.
□	54-27	766		Same as above.	Cycle 2 heating.
▽	54-27	494		Same as above.	Cycle 2 cooling.
◇	54-27	84-766		Same as above.	Scrubbed, washed, and wiped; measured in helium (10 microns); cycle 1 heating.
◁	54-27	480		Same as above.	Cycle 1 cooling.
▷	54-27	783		Same as above.	Cycle 2 heating.
⊖	54-27	511		Same as above.	Cycle 2 cooling.
▲	54-27	78-788		Same as above.	Polished to a mirror like finish and washed; measured in helium (10 microns); cycle 1 heating
◧	54-27	[illegible]30		Same as above.	Cycle 1 cooling.
◆	54-27	7[illegible]6		Same as above.	Cycle 2 heating.
▼	54-27	544		Same as above.	Cycle 2 cooling.
◐	54-27	733		Same as above.	Cycle 3 heating.
◧	54-27	489		Same as above.	Cycle 3 cooling.
⬖	57-48	83-893	± 10	Aluminum alloy 24 ST, Alclad.	As received; measured in vacuum (5×10^{-4} mm Hg).
				(continued onto next page)	

NORMAL TOTAL EMITTANCE — ALUMINUM + COPPER + EX_1 (continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▲	57-48	83-822	± 10	Aluminum alloy 24 ST, Alclad.	Measured in vacuum (5 x 10^{-4} mm Hg) ; same data for cleaned (with liquid detergent) and polished (with fine polishing compounds on a buffing wheel).
▼	57-48	80-833	± 10	Aluminum alloy 24 ST, Alclad.	Oxidized in air at red heat for 30 min. ; measured in vacuum (5 x 10^{-4} mm Hg) .
◀	58-34	368-801		Aluminum alloy 24 ST.	Weathered; using flat shield.
▶	58-34	300-808		Aluminum alloy 24 ST.	Weathered; using conical shield.
■	58-34	314-647		Same as above.	Same as above.
◘	44-1	301-433	± 10	Aluminum alloy 24 ST.	Co...tant emittance over the specified temperature range.

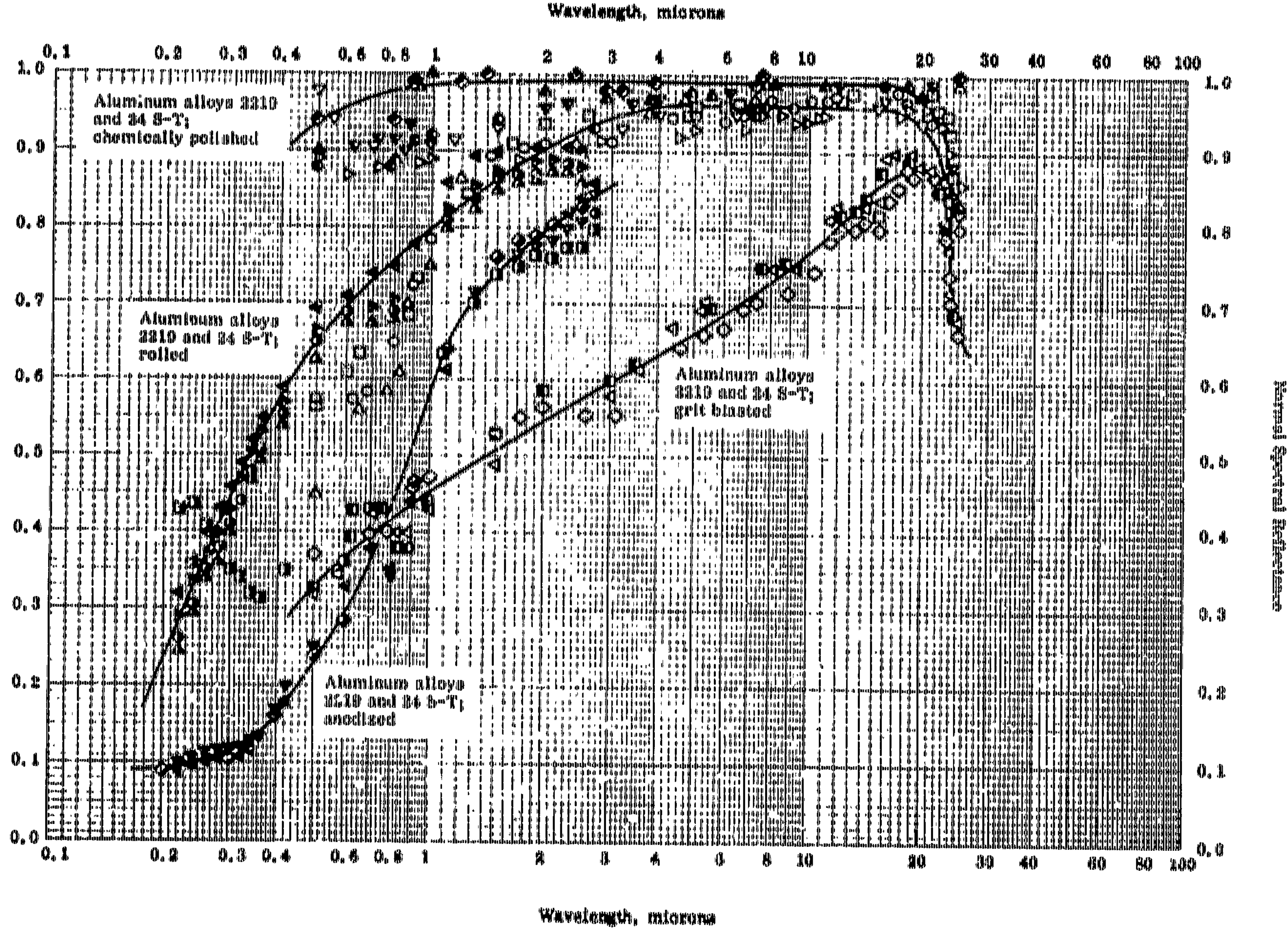


NORMAL SPECTRAL EMITTANCE — ALUMINUM + COPPER + ΣX_i

NORMAL SPECTRAL EMITTANCE -- ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	59-16	823	2-14	± 4	Aluminum alloy 2024; nominal composition: 4.5 Cu, 1.5 Mg, and 0.6 Mn.	Ultrasonically machined; oxidized in air at 823 K for 3 hrs; measured in air.
△	63-16	323	0.35-3.6		Same as above; surface roughness: 0.099 and 0.071 microns in x and y directions respectively.	Measured in nitrogen.
□	63-16	323	0.35-3.6		Same as above; surface roughness: 0.046 and 0.038 microns in x and y directions respectively.	Measured in nitrogen.
◇	63-16	323	0.35-27		Same as above; surface roughness: 0.162 and 0.178 microns in x and y directions respectively.	Measured in nitrogen.



NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + COPPER + ΣX$_i$

NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Repl. Error%	Sample Specifications	Remarks
○	62-23	298	0.5-25.0		2219 Al; 6.3 Cu, 0.40 Mn, 0.30 Fe, 0.20 Si, 0.10 Zn, 0.10 Ti, 0.02 Mg and 0.15 others.	As received.
△	62-23	298	0.5-25.0		2219 Al.	Exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.
□	62-23	298	0.5-25.0		2219 Al.	Exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
▽	62-23	298	0.5-25.0		2219 Al.	Chemically milled.
◇	62-23	298	0.5-25.0		2219 Al.	Grit blasted.
◁	62-23	298	0.5-25.0		2219 Al.	Chemically milled and grit blasted.
▷	62-23	298	0.5-25.0		2219 Al.	Chemically milled and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
●	62-23	298	0.5-25.0		2219 Al.	Chemically milled and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.
▲	62-2.	298	0.5-25.0		2219 Al.	Chemically polished.
■	62-23	298	0.5-25.0		2219 Al.	Chemically polished and grit blasted.
▼	62-23	298	0.5-25.0		2219 Al.	Chemically polished and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
◆	62-23	298	0.5-25.0		2219 Al.	Chemically polished and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.

(Continued onto next page)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
◀	61-83	298	0.3-2.8		Al alloy 24 S-T; 91.08 Al, 4.9 Cu, ..8 Mg, 0.9 Mn, 0.5 Si, 0.6 Fe, 0.25 Zn, and 0.1 Cr.	Clean rolled; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
▶	61-83	298	0.3-2.8		Al alloy 24 S-T.	Clean rolled; exposed to G. E. AU-3 Hg lamp radiation for 20 hrs; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
●	61-83	298	0.3-2.8		Al alloy 24 S-T.	Clean rolled; exposed to G. E. AU-3 Hg lamp radiation for 60 hrs; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
▲	61-83	298	0.3-2.8		Al alloy 24 S-T.	Clean rolled; exposed to G. E. AU-3 Hg lamp radiation for 100 hrs; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
■	61-83	298	0.3-2.8		Al alloy 24 S-T.	Anodized; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
▼	61-83	298	0.3-2.8		Al alloy 24 S-T.	Anodized; exposed to G. E. AU-3 Hg lamp radiation for 20 hrs; measured in 10^{-8} mm Hg or lower air; freshly smoked MgO as standard.
					(Continued onto next page)	

NORMAL SPECTRAL REFLECTANCE — ALUMINUM + COPPER + ΣX_i (continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. ° K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
◆	61-23	298	0.3-2.6		Al alloy 24 S-T.	Anodized; exposed to G. E. AH-3 Hg lamp radiation for 60 hrs; measured in 10^{-5} mm Hg or lower air; freshly smoked MgO as standard.
◀	61-23	298	0.3-2.6		Al alloy 24 S-T.	Anodized; exposed to G. E. AH-3 Hg lamp radiation for 100 hrs; measured in 10^{-5} mm Hg or lower air; freshly smoked MgO as standard.

PROPERTIES OF ALUMINUM + MAGNESIUM + ΣX_i

REPORTED VALUES

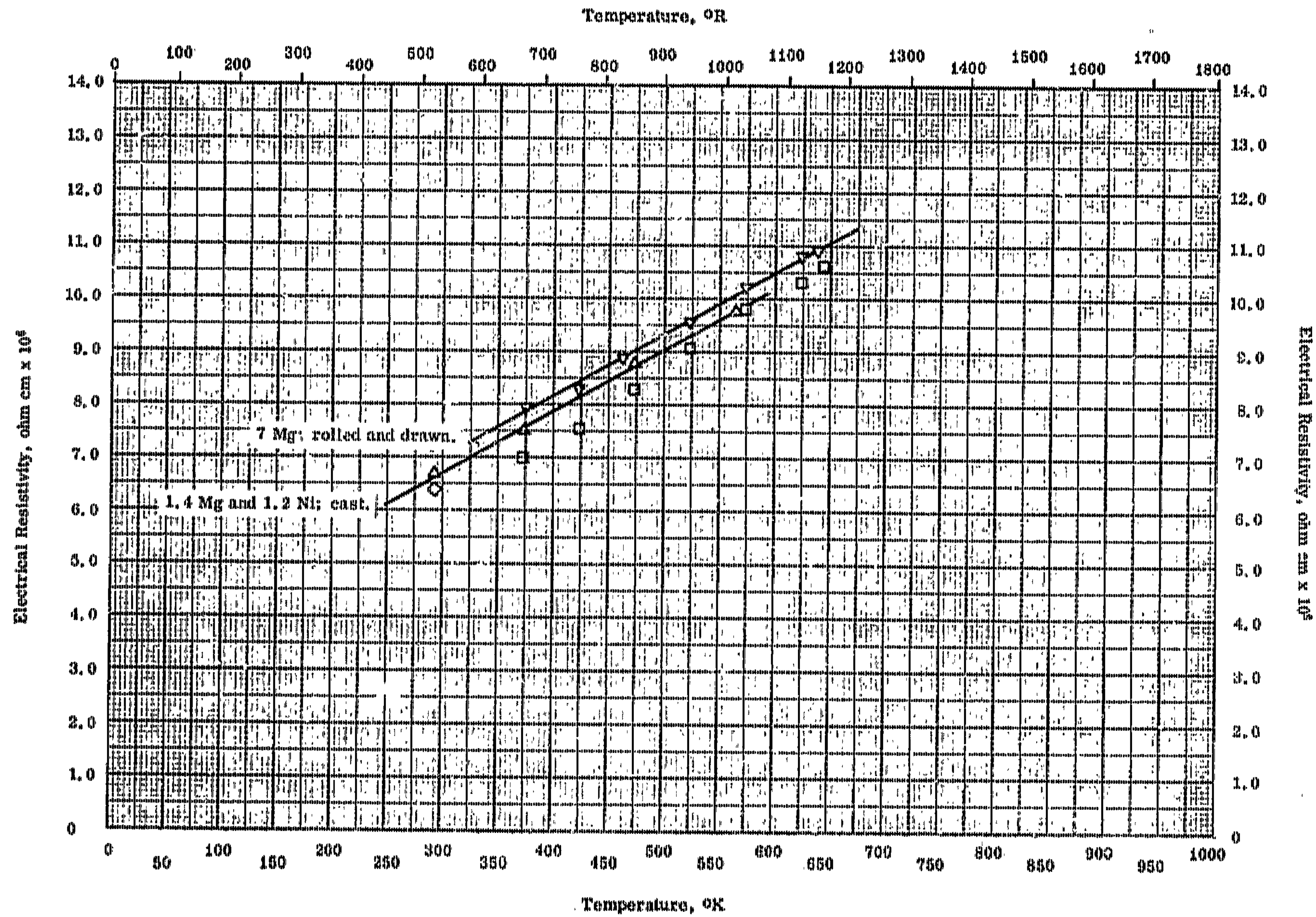
Density:		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	1.5 Mg and 0.3 Mn	2.70	[illegible]
□	2.5 Mg and 0.3 Mn	2.68	167
△	3.5 Mg and 0.4 Mn	2.67	167
▽	5 Mg and 0.4 Mn	2.65	165

Melting Point:		K	R
●	1.5 Mg and 0.3 Mn	[illegible]	[illegible]
■	2.5 Mg and 0.3 Mn	[illegible]	[illegible]
▲	3.5 Mg and 0.4 Mn	[illegible]	[illegible]
▼	5 Mg and 0.4 Mn	[illegible]	1527

PROPERTIES OF ALUMINUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-1	293		98.2 Al, 1.5 Mg, and 0.3 Mn.	Held at 1180 R for 2-6 hrs for complete softening.
●	55-1	893		Same as above.	Same as above.
□	55-1	293		97.2 Al, 2.5 Mg, and 0.3 Mn.	Same as above.
■	55-1	883		Same as above.	Same as above.
△	55-1	293		96.1 Al, 3.5 Mg, and 0.4 Mn.	Same as above.
▲	35-1	865		Same as above.	Same as above.
▽	55-1	293		94.6 Al, 5 Mg, and 0.4 Mn.	Same as above.
▼	55-1	848		Same as above.	Same as above.

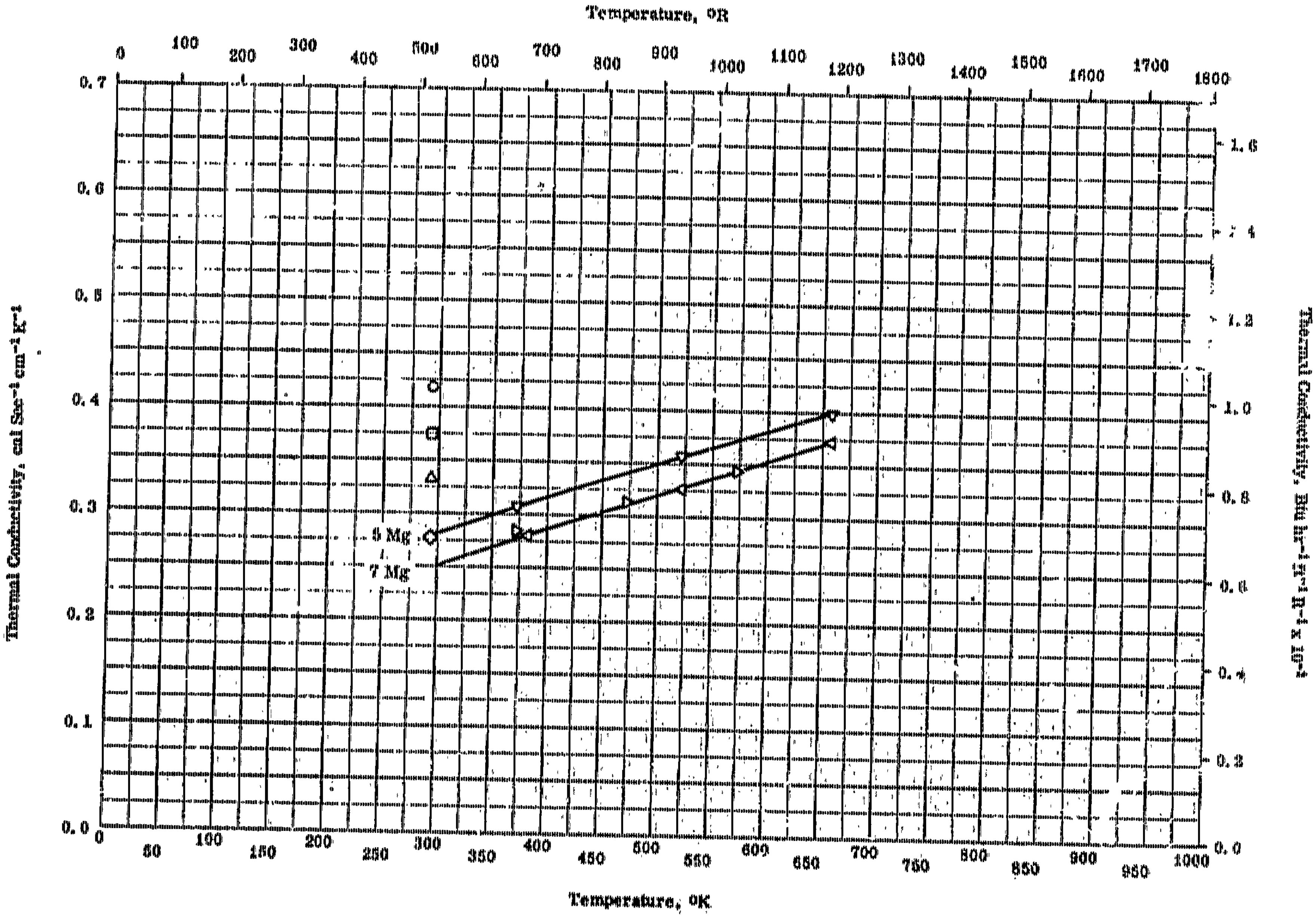


ELECTRICAL RESISTIVITY — ALUMINUM + MAGNESIUM + ΣX_i

ELECTRICAL RESISTIVITY — ALUMINUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	40-1	373-643		Hydronalium 51 (German design.); nominal: 5-12 Mg, 0.2-1.5 Si, and 0.2-0.5 Mn.	Cast at 700 C into molds at 200 C; rolled and drawn, then turned into rods.
▽	40-1	375-638		Hydronalium 7 (German design.); nominal: 7 Mg, 0.45 Mn.	Same as above.
△	40-2	293-573		Al Alloy R R 131 D (British design.); 1.30 Mg, 1.20 Ni, 0.60 Si, 0.45 Zn, 0.44 Mn, 0.30 each, Cu, Fe, 0.25 Co, 0.18 Cr, and 0.12 Ti.	Cast, as received.
◇	40-2	293		Same as above.	Cast; heated 10 hrs at 130-170 C and air cooled.

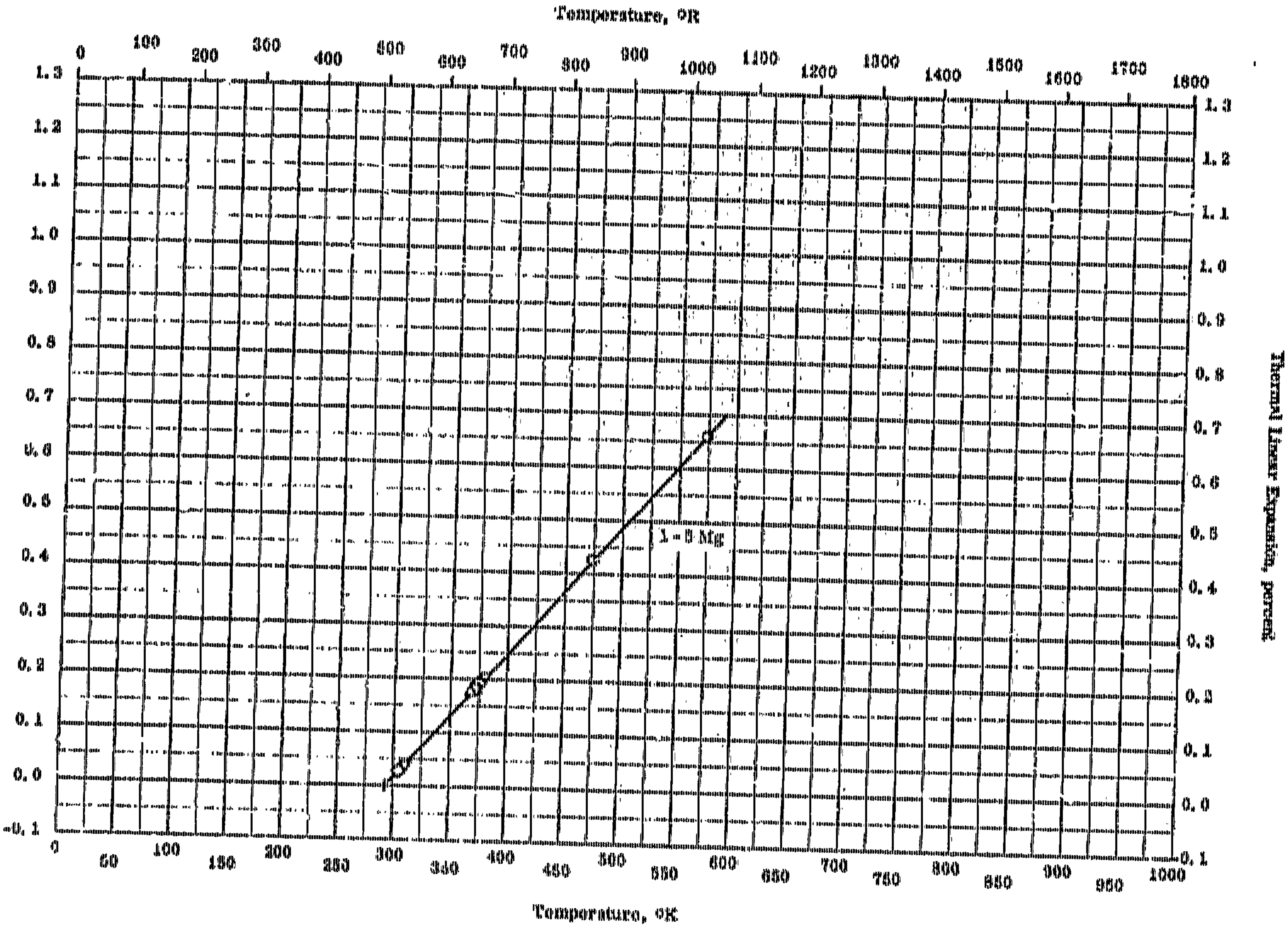


THERMAL CONDUCTIVITY — ALUMINUM + MAGNESIUM + ΣX_i

THERMAL CONDUCTIVITY — ALUMINUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-1	298		98.2 Al, 1.5 Mg, 0.3 Mn; density 169 $lb_m ft^{-3}$.	Held 2 - 5 hrs at 360 - 400 C.
□	55-1	298		97.2 Al, 2.5 Mg, 0.3 Mn; density 167 $lb_m ft^{-3}$.	Same as above.
△	55-1	298		96.1 Al, 3.5 Mg, 0.4 Mn; density 167 $lb_m ft^{-3}$.	Same as above.
◇	55-1	298		94.6 Al, 5 Mg, 0.4 Mn; density 165 $lb_m ft^{-3}$.	Held at 330 - 370 C and slowly cooled.
▽	40-1	372-661		Hydronalium 51 (German design.); 5 Mg, 0.5 - 1.5 Si, 0.2 - 0.5 Mn; nominal composition.	Same as above.
◁	40-1	372-661		Hydronalium 7 (German design.); 92.5 Al, 7 Mg, 0.5 Mn; nominal composition.	Same as above.
▷	40-2	293-673		RR 131D (British design.); 1.30 Mg, 1.20 Ni, 0.60 Si, 0.45 Zn, 0.44 Mn, 0.30 ea. Cu, Fe, 0.25 Co, 0.18 Cr, 0.12 Ti.	Cast

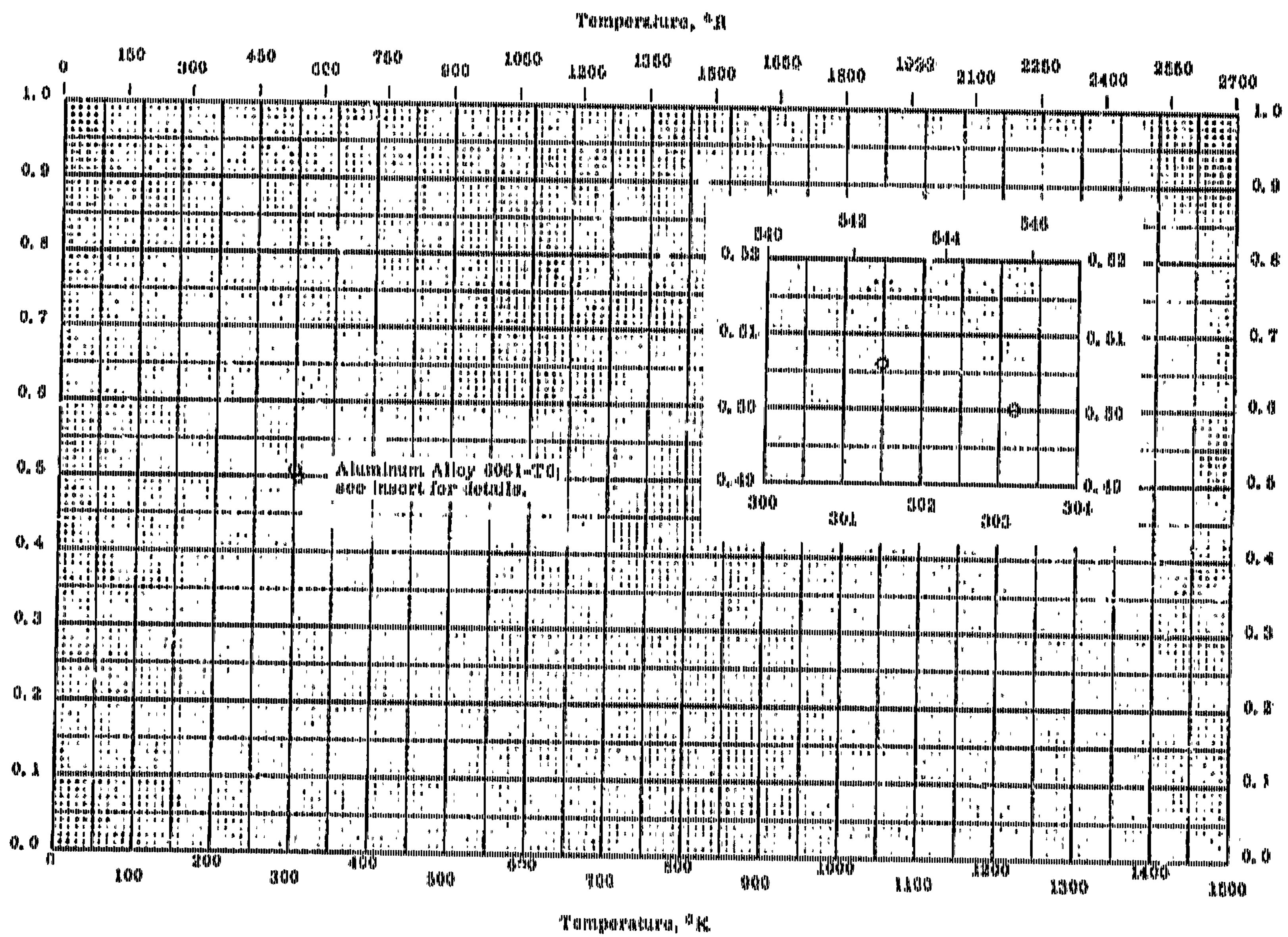


THERMAL LINEAR EXPANSION -- ALUMINUM + MAGNESIUM + EX_1

THERMAL LINEAR EXPANSION — ALUMINUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Sym bol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	55-1	293-373		94.6 Al, 5.0 Mg, and 0.4 Mn; density 165 lb ft^{-3}.	Held at 350-370 C for max softening and cooled slowly to 250 C.
△	50-1	293-373		96.1 Al, 3.0 Mg, and 0.4 Mn; density 167 lb ft^{-3}.	Held 2-6 hrs at 360-400 C for complete softening.
◇	55-1	293-373		97.2 Al, 2.5 Mg, and 0.3 Mn; density 168 lb ft^{-3}.	Same as above.
▽	55-1	293-373		98.2 Al, 1.5 Mg, and 0.3 Mn; density 169 lb ft^{-3}.	Same as above.
○	49-2	373-573		Al Alloy RR 53D (British design.); 1.30 Mg, 1.20 Ni, 0.50 Si, 0.45 Zn, 0.44 Mn, 0.30 Cu, Fe each, 0.25 Co, 0.18 Cr, and 0.12 Ti.	Cast, held 10 hrs at 160 C - 170 C, and air-cooled.

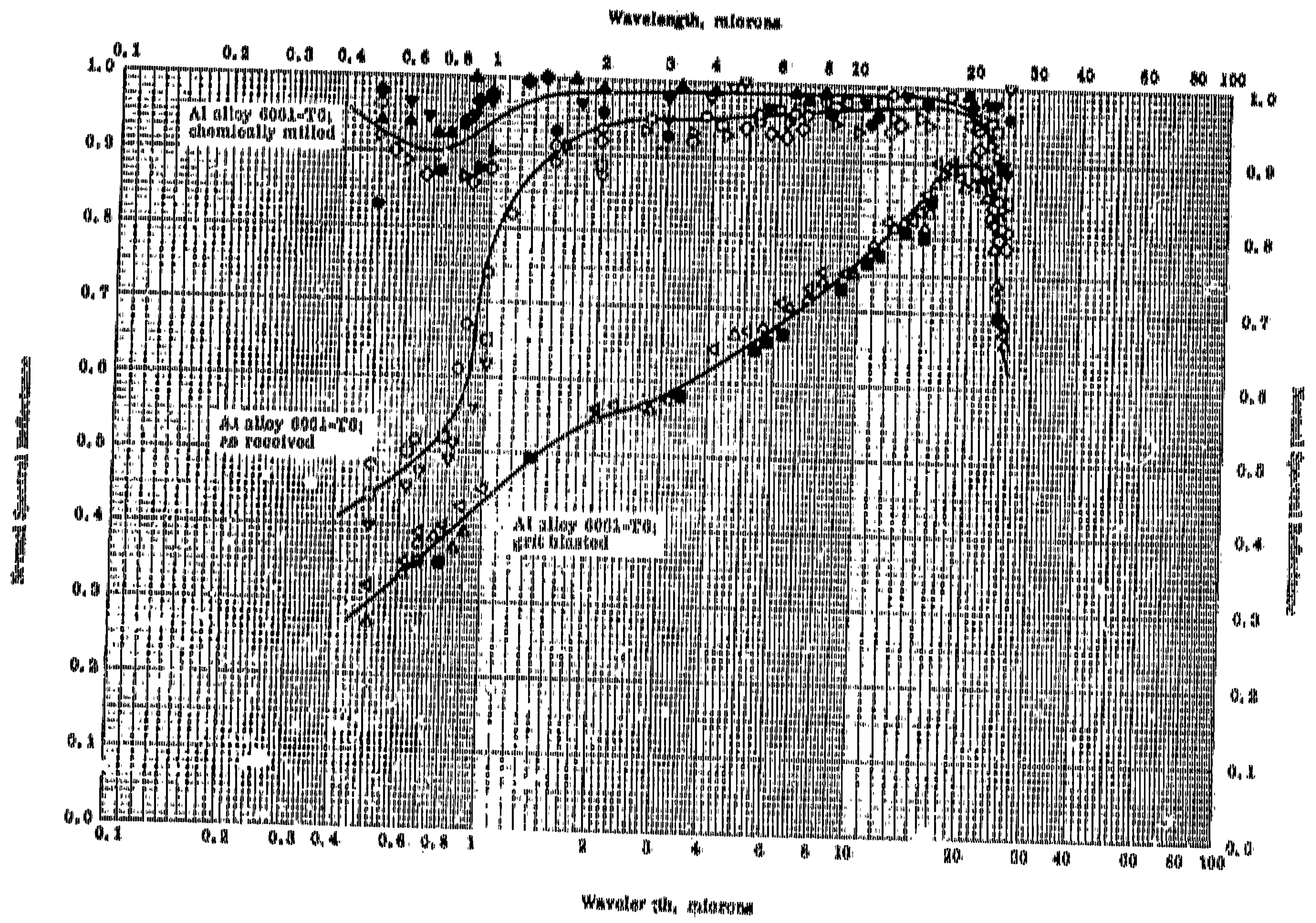


HEMISPHERICAL TOTAL EMITTANCE -- ALUMINUM + MAGNESIUM + ΣX$_i$

HEMISPHERICAL TOTAL EMITTANCE — ALUMINUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	64-7	301-303		Aluminum alloy 6061-T6; nominal: 0.8 – 1.2 Mg, 0.40 – 0.8 Si, 0.7 Fe, 0.15 – 0.40 Cu, 0.15 – 0.35 Cr, 0.25 Zn, 0.15 Mn, and 0.15 Ti.	Buffed surface; 2×10^{-7} mm Hg vacuum.

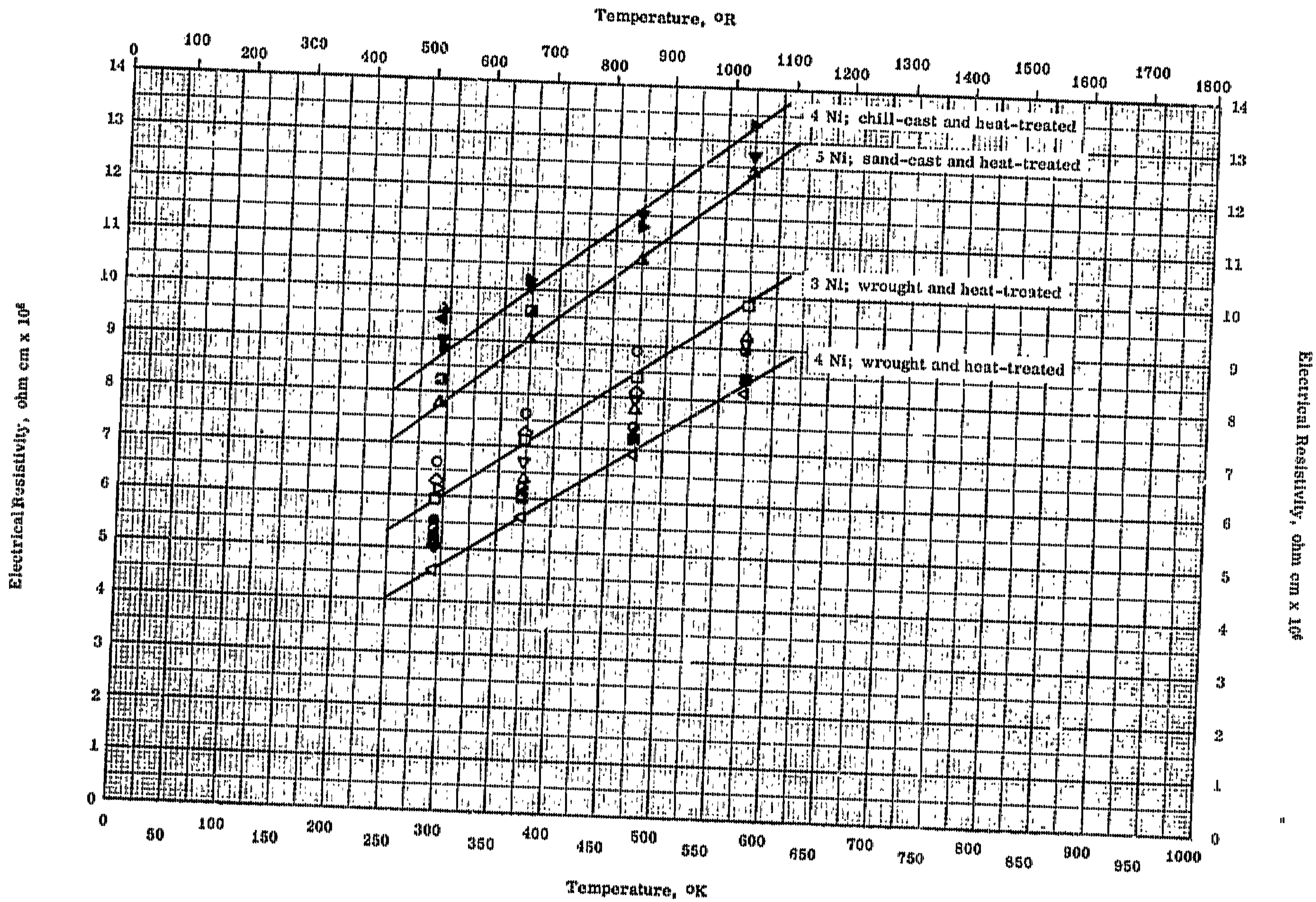


NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + MAGNESIUM + ΣX

NORMAL SPECTRAL REFLECTANCE -- ALUMINUM +MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-23	298	0.5-25.0		Aluminum alloy 6061-T6; nominal: 0.8 - 1.2 Mg, 0.40 - 0.8 Si, 0.7 Fe, 0.15 - 0.40 Cu, 0.15 - 0.35 Cr, 0.25 Zn, 0.15 Mn, and 0.15 Ti.	As received.
△	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Grit blasted.
□	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	4×10^{-8} mm Hg vacuum exposure for 24 hrs.
▽	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	X-ray exposure in a vacuum of 4×10^{-8} mm Hg for 24 hrs.
◇	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically milled.
◁	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically milled and grit blasted.
▷	62-23	298	0.5-[illegible].0		Aluminum alloy 6061-T6.	Chemically milled and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
●	62-23	298	0.5-25.0		Aluminum alloy 6061-T5.	Chemically milled and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.
▲	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically polished.
■	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically polished and grit blasted.
▼	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically polished and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
◆	62-23	298	0.5-25.0		Aluminum alloy 6061-T6.	Chemically polished and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.



ELECTRICAL RESISTIVITY -- ALUMINUM + NICKEL + ΣX$_i$

ELECTRICAL RESISTIVITY — ALUMINUM + NICKEL + ΣX_i

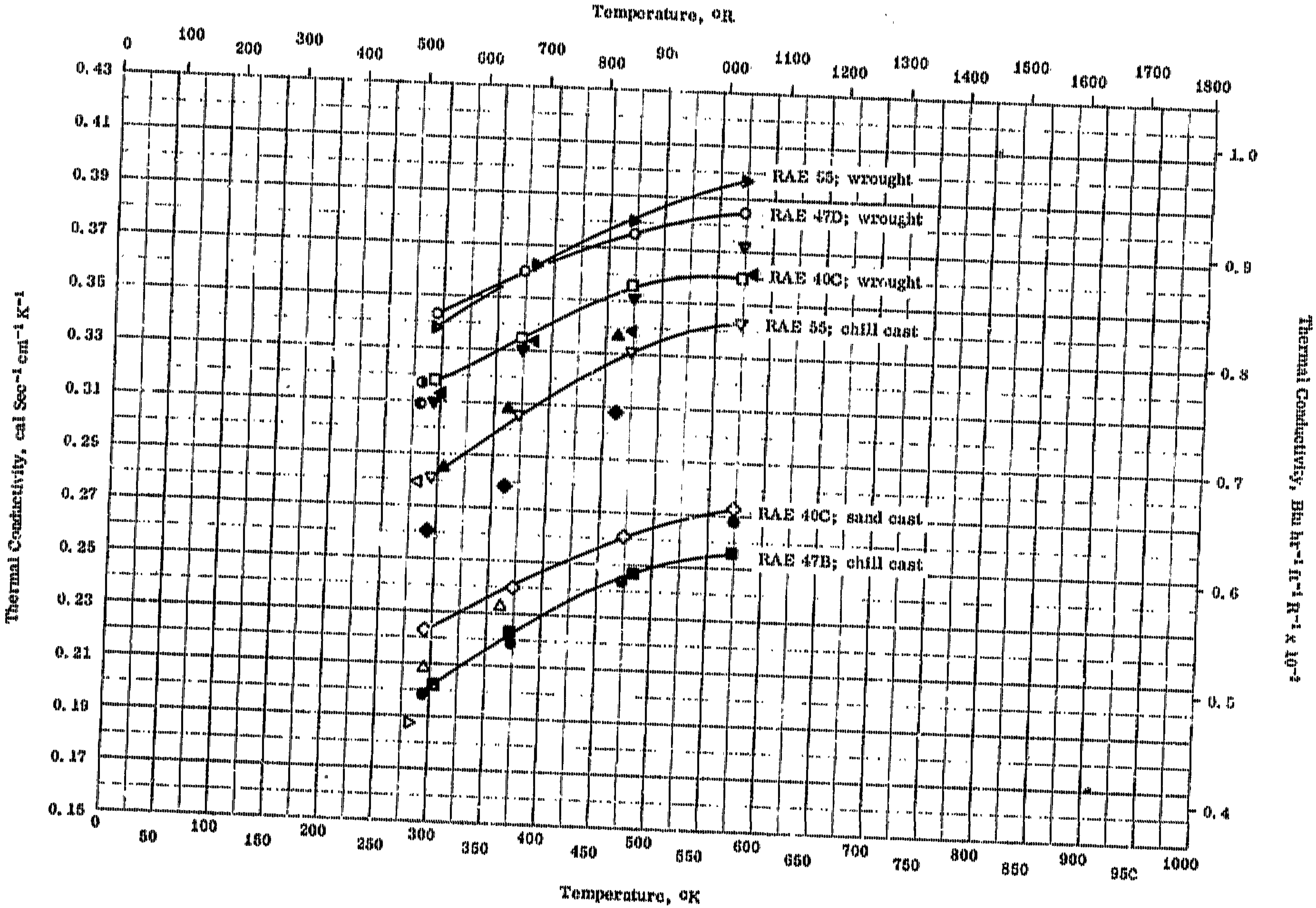
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-473		Al Alloy RAE55 (British design.): 2.90 Ni, 1.89 Cu, 1.55 Mn, 0.56 Mg, 0.43 Fe, 0.21 Si, 0.15 Cr, and 0.07 Ti.	As received.
□	49-2	293-573		Same as above.	4 hrs solution heat-treated at 570 C, boiling water quenched, held 12 hrs at 200 C, and air cooled; heat-treated at 300 C; values unreliable, segregation, blow holes in cast, cracks in forged.
△	49-2	298-573		Same as above.	4 hrs solution heat-treated at 570 C, boiling water quenched, held 12 hrs at 200 C, air cooled; heat-treated at 400 C; values unreliable, segregation, blow holes in cast, cracks in forged.
◇	49-2	293-473		Al Alloy RAE55 (British design.): 2.85 Ni, 2.02 Mn, 1.07 Cu, 0.52 Mg, 0.49 Cr, 0.41 Fe, 0.17 Si, and 0.07 Ti.	Wrought, as received; values unreliable, segregation, blow holes in cast, cracks in forged.
▽	49-2	293-573		Same as above.	Wrought, solution heat-treated 40 hrs at 570 C; boiling water quenched, aged 40 hrs at 160 C, cooled in air; values unreliable, segregation, blow holes in cast, cracks in forged.
●	49-2	293		Al Alloy RAE55 (British design.): 3.01 Ni, 1.68 Cu, 0.49 Mg, 0.40 Fe, 0.17 Cr, and 0.15 Si.	Wrought, as received; values unreliable, segregation, blow holes in cast, cracks in forged.
■	49-2	293-573		Same as above.	Wrought, solution heat-treated 40 hrs at 570 C; boiling water quenched, aged 40 hrs at 160 C, cooled in air; values unreliable, segregation, blow holes in cast, cracks in forged.

(Continued onto next page)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▲	49-2	293		Al Alloy RAE47B (British design.): 4.0 Ni, 3.07 Mn, 1.0 Cu, 0.5 each Mg, Fe, and 0.2 each Si, Ti.	Sand cast; as received.
▼	49-2	293-573		Al Alloy RAE47B (British design.): 4.0 Ni, 3.07 Mn, 1.0 Cu, 0.5 each Mg, Fe, and 0.2 each Si, Ti.	Sand cast; heat-treated.
◀	49-2	293		Same as above.	Chill cast; as received.
▶	49-2	293-573		Same as above.	Chill cast; heat-treated.
◆	49-2	293		Al Alloy RAE47D (British design.): 4.0 Ni, 3.0 Mn, 1.0 Cu, 0.5 Mg, < 0.5 Fe, 0.4 Be, and 0.3 Si.	Wrought; as received.
◁	49-2	293-573		Same as above.	Wrought, heat-treated 6 hrs at 570 C, cold water quenched, aged 20 hrs at 160 C, and air cooled.
▷	49-2	293		Al Alloy RAE40C (British design.): 5.0 Ni, 3.07 Mn, 2.0 Cu, 0.5 each Mg, Cr, < 0.5 Fe, 0.4 Be, and 0.3 Si.	Wrought, as received.
●	49-2	293-573		Same as above.	Wrought, heat-treated 6 hrs at 570 C, cold water quenched, aged 20 hrs at 150 C, and air cooled.
◪	49-2	293-373		Same as above.	Sand cast; as received.
▲	49-2	293-573		Same as above.	Sand cast heat-treated, 6 hrs at 570 C, cold water quenched, aged 20 hrs at 150 C, and air cooled.



THERMAL CONDUCTIVITY — ALUMINUM + NICKEL + ΣX_i

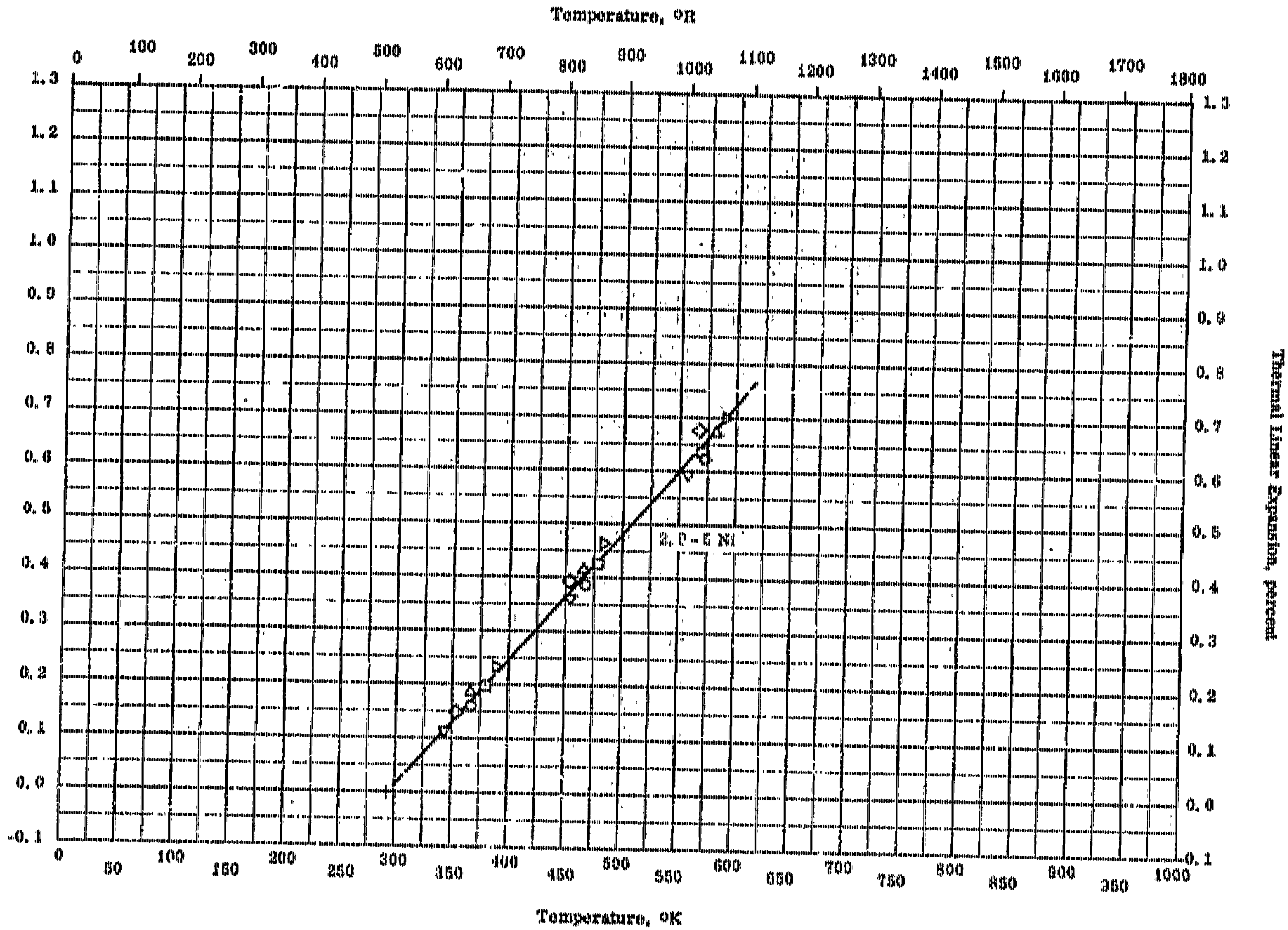
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◁	49-2	293		RAE 40C (British design.); 5.0 Ni, 3.0 Mn, 2.0 Cu, 0.5 ea. Mg, Cr, 0.5 > Fe, 0.4 Be, 0.3 Si.	Wrought; 6 hrs at 570 C, cold water quenched, aged 20 hrs at 150 C, and air cooled.
□	49-2	293-573		Same as above.	Wrought; same as above with additional treatment at 300 C and air cooled.
△	49-2	293-373		Same as above.	Sand cast; 6 hrs at 570 C, cold water quenched, aged 20 hrs at 150 C, and air cooled.
◇	49-2	293-573		Same as above.	Sand cast; same as above with additional heat treatment at 300 C and air cooled.
◍	49-2	293		RAE 47D (British design.); 4.0 Ni, 3.0 Mn, 1.0 Cu, 0.5 Mg, 0.5 > Fe, 0.4 Be, 0.3 Si.	Wrought; 6 hrs at 570 C, cold water quenched, aged 20 hrs at 150 C, and air cooled.
○	49-2	293-573		Same as above.	Wrought; same as above with additional treatment at 300 C, and air cooled.
▷	49-2	293		RAE 47B (British design.); 4.0 Ni, 3.0 Mn, 1.0 Cu, 0.5 ea. Mg, Fe, 0.2 ea Si, Ti.	Sand cast.
●	49-2	293-573		Same as above.	Sand cast; heat treated at 300 C, and air cooled.
■	49-2	293-573		Same as above.	Chill cast; heat treated at 300 C, and air cooled.
▲	49-2	293-473		RAE 55 (British design.); 3.85 Ni, 2.02 Mn, 1.07 Cu, 0.62 Mg, 0.40 Cr, 0.41 Fe, 0.17 Si, 0.07 Ti.	Wrought; solution heat treated 4 hrs at 570 C, quenched in boiling water, aged 40 hrs at 160 C, cooled in air; values unreliable due to segregation, blow holes in cast, cracks in forged.
				(Continued onto next page)	

THERMAL CONDUCTIVITY — ALUMINUM + NICKEL + ΣX_i (continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▼	49-2	293-573		Same as above.	Wrought; same as above, with additional heat treatment at 300 C, and air cooled.
○	49-2	293		RAE 55 (British design); 3.01 Ni, 1.08 Cu, 0.49 Mg, 0.40 Fe, 0.17 Cr, 0.15 Si.	Wrought; same as above without added heat treatment.
▶	49-2	293-573		RAE 55 (British design); 3.01 Ni, 1.68 Cu, 0.49 Mg, 0.40 Fe, 0.17 Cr, 0.16 Si.	Same treatment as above except with additional heating at 300 C and air cooled.
◆	49-2	293-473		RAE 65 (British design): 2.90 Ni, 1.89 Cu, 1.55 Mn, 0.56 Mg, 0.43 Fe, 0.21 Si, 0.16 Cr, 0.07 Ti.	Chill cast; solution heat treated 4 hrs at 570 C, quenched in boiling water, aged 12 hrs at 200 C, air cooled; values unreliable.
▽	49-2	293-573		Same as above.	Chill cast; same as above with additional heat treatment at 300 C, and air cooled.
◀	49-2	293-573		Same as above.	Chill cast; same as above except final heat treatment at 400 C.

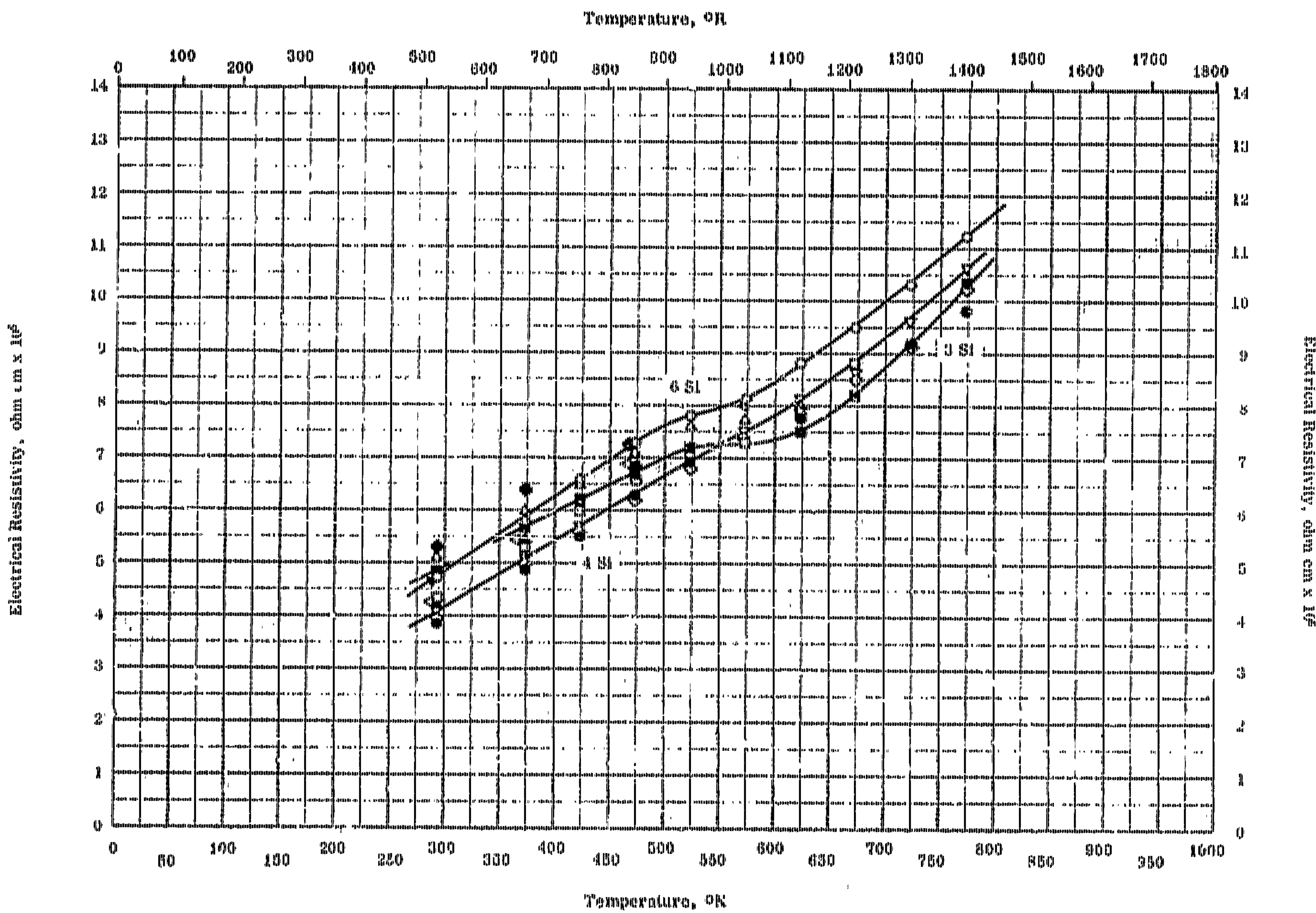


THERMAL LINEAR EXPANSION -- ALUMINUM + NICKEL + ΣX_i

THERMAL LINEAR EXPANSION -- ALUMINUM + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-573		Aluminum Alloy RAE 40 C (British design.); 5.0 Ni, 3.0 Mn, 2.0 Cu, 0.5 Mg, Cr each, <0.5 Fe, 0.4 Be, and 0.3 Si.	Plotted data show average for 2 samples (within 1.2%); (a) wrought. (b) wrought, heat-treated 6 hrs at 570 C, cold water quenched, 20 hrs at 150 C, and air-cooled.
□	49-2	293-573		Same as above.	Plotted data show average for 2 samples (within 0.6%); (a) Cast. (b) Cast, heat-treated as above.
△	49-2	293-573		Aluminum Al: y RAE 55 (British design.); 3.05 Ni, 1.08 Mn, 1.68 Cu, 0.50 Mg, 0.45 Cr, 0.39 Fe, 0.19 Si, and 0.08 Ti.	Wrought, values unreliable because of cracks.
◇	49-2	293-573		Aluminum Alloy RAE 55 (British design.); 2.90 Ni, 1.89 Cu, 1.65 Mn, 0.56 Mg, 0.43 Fe, 0.21 Si, 0.15 Cr, and 0.07 Ti.	Cast; values unreliable because of segregation and blow holes.
▽	49-2	293-573		Aluminum Alloy RAE 470 (British design.); 4.0 Ni, 3.0 Mn, 1.0 Cu, 0.5 Mg, <0.6 Fe, 0.4 Be, and 0.3 Si.	Plotted data show average for 2 samples (within 1%); (a) wrought. (b) wrought, heat-treated 6 hrs at 570 C, cold water quenched, 20 hrs at 160 C, and air-cooled.
▷	49-2	293-573		Aluminum Alloy RAE 47B (British design.); 4.0 Ni, 3.0 Mn, 1.0 Cu, 0.5 Mg, Fe each, and 0.2 Si, Ti each.	Cast; tested in sand cast and chill cast condition.

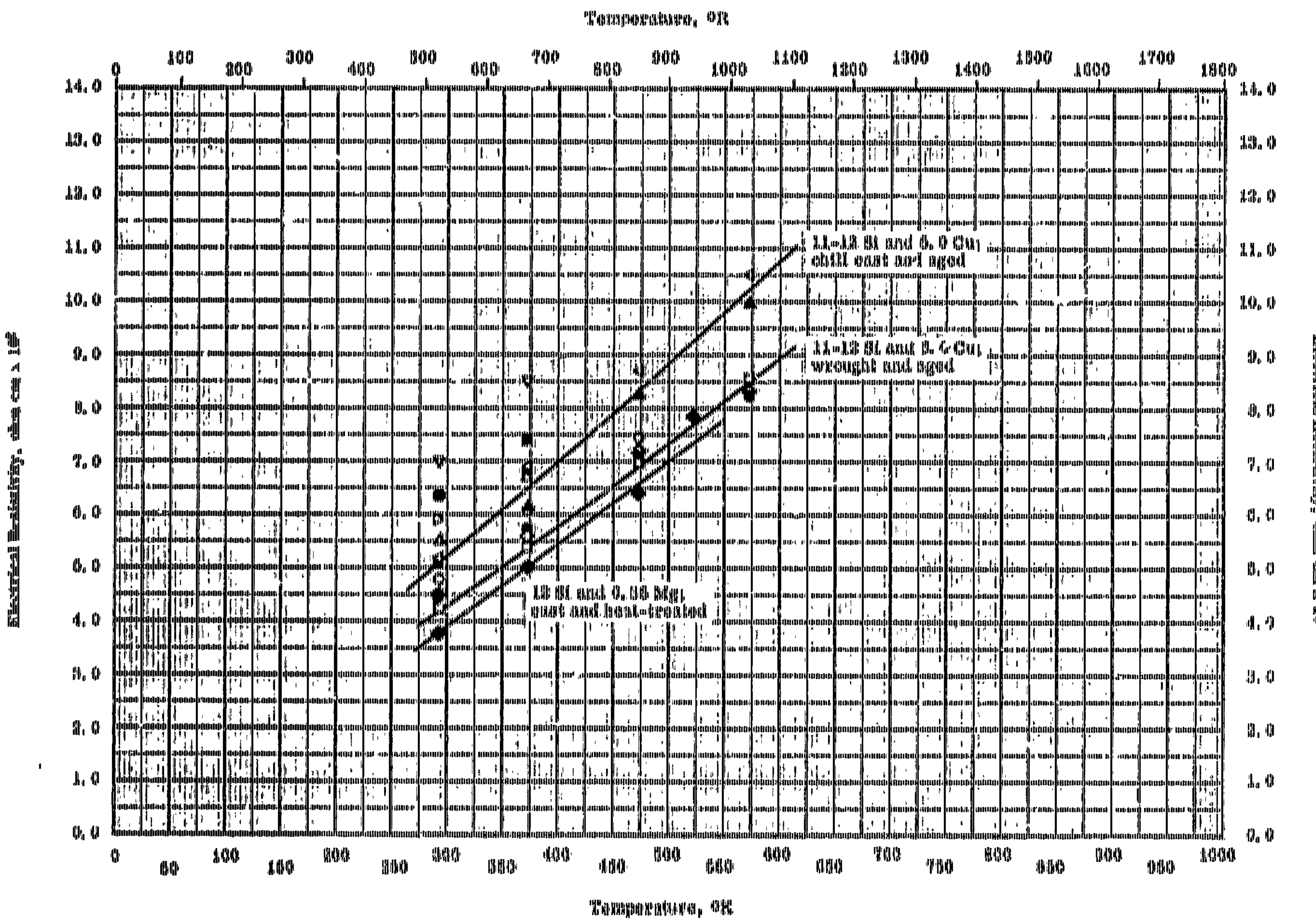


ELECTRICAL RESISTIVITY — ALUMINUM + SILICON + ΣXᵢ
(3-6 Si)

ELECTRICAL RESISTIVITY -- ALUMINUM + SILICON + ΣX$_i$
(3-6 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	48-1	293-773		6.04 Si, 1.08 Cu, 0.10 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Cast; held 6 hrs at 970 F and quenched in water.
□	48-1	293-673		6.00 Si, 1.03 Cu, 0.10 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
△	48-1	293-623		4.00 Si, 3.10 Cu, 0.10 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
◇	48-1	293-773		3.95 Si, 1.04 Cu, 0.10 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
▽	48-1	293-773		3.91 Si, 3.08 Cu, 0.15 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
●	48-1	293-773		3.06 Si, 1.04 Cu, 0.15 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
■	48-1	293-773		3.06 Si, 3.08 Cu, 0.15 Fe, 0.05 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
▲	49-2	293-573		Aluminum alloy RR50 (British design.); 2.35 Si, 1.40 Cu, 1.18 Fe, 0.90 Ni, 0.19 Ti, and 0.13 Mg.	Cast; heated 10 hrs at 160 C and air cooled.
▼	49-2	293		Same as above.	Cast.
◆	49-2	293-473		Aluminum alloy RR53C (British design.); 2.42 Si, 1.33 Cu, 1.13 Fe, 0.87 Ni, 0.80 Mg, and 0.15 Ti.	Cast.
◁	49-2	293-573		Same as above.	Cast; heated 2 hrs at 530 C, water-quenched, and heated 15 hrs at 165 C.



ELECTRICAL RESISTIVITY — ALUMINUM + SILICON + ΣXᵢ
(11-13)

ELECTRICAL RESISTIVITY -- ALUMINUM + SILICON + ΣX_i
(11-12 Si)

REFERENCE INFORMATION

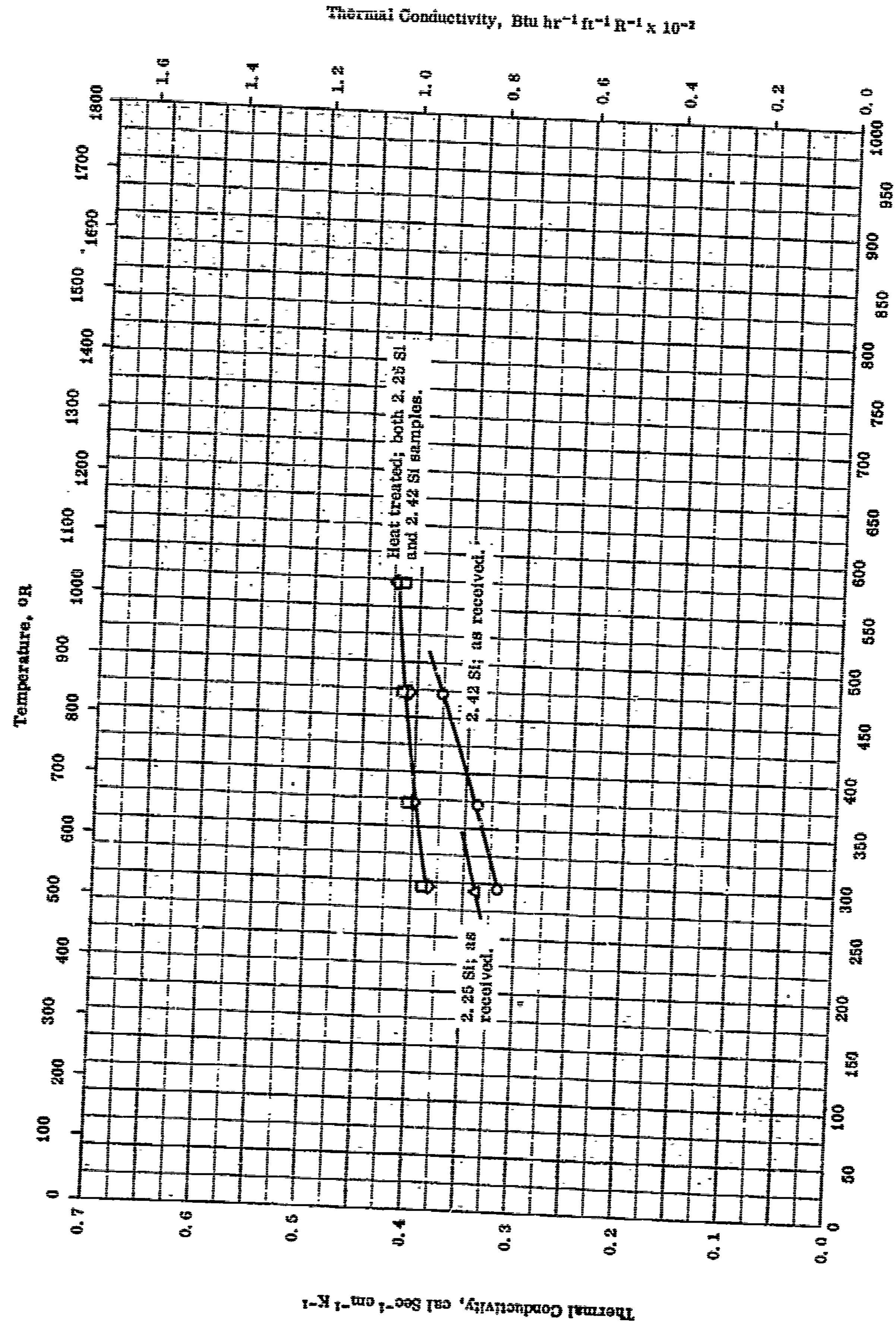
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-473		Al Alloy Lo-Ex (British design.): 11.80 Si, 1.03 Cu, 1.02 Ni, 0.91 Mg, 0.60 Fe, 0.03 Mn, and 0.02 Ti.	Wrought.
□	49-2	293-573		Same as above.	Wrought; heated 12 hrs at 520 C, quenched, aged 4 hrs at 135 C, cooled in air, aged 4 hrs at 200 C, and then air cooled.
△	49-2	293-373		Al Alloy RAE SA44 (British design.): 11.0 Si, 5.0 Cu, 0.5 Mg, <0.5 Fe, 0.4 Mn, 0.3 Co, and 0.1 Ti.	Wrought; a range of values of ± 4% for different samples.
◇	49-2	292-573		Same as above.	Wrought; heated 3 hrs at 500 C, cold-water quenched, aged 16 hrs at 165 C, and air cooled; a range of values ± 4% for different samples.
▽	49-2	293-373		Same as above.	Chill cast; a range of values ± 7% for different samples.
◁	49-2	293-573		Same as above.	Chill cast; heated 3 hrs at 500 C, cold-water quenched, and aged 16 hrs at 165 C; a range of values ± 7% for different samples.
▷	49-2	293-373		Al Alloy RAE SA1 (British design.): 11.0 Si, 5.0 Cu, 0.6 Mg, <0.5 Fe, 0.2 Co, and 0.05 Ti.	Wrought; a range of values ± 7% for different samples.
●	49-2	293-573		Same as above.	Wrought; heated 3 hrs at 500 C, cold-water quenched, aged 16 hrs at 165 C, and air cooled; a range of values ± 7% for different samples.
■	49-2	293-373		Same as above.	Chill cast; a range of values ± 7% for different samples.

(Continued onto next page)

ELECTRICAL RESISTIVITY -- ALUMINUM + SILICON + ΣX_i (continued)
(11-12 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▲	49-2	293-373		Same as above.	Chill cast; heated 3 hrs at 500 C, cold-water quenched, and aged 16 hrs at 165 C; a range of values ±7% for different samples.
▼	49-2	293		Al Alloy Alpax Gamma (British design.): 12.0 Si, 0.35 Mg, 0.29 Mn, and 0.28 Fe.	Cast, as received.
◆	49-2	293-573		Same as above.	Cast; held 4 hrs at 515 C cold water quenched, held 16 hrs at 150-165 C.

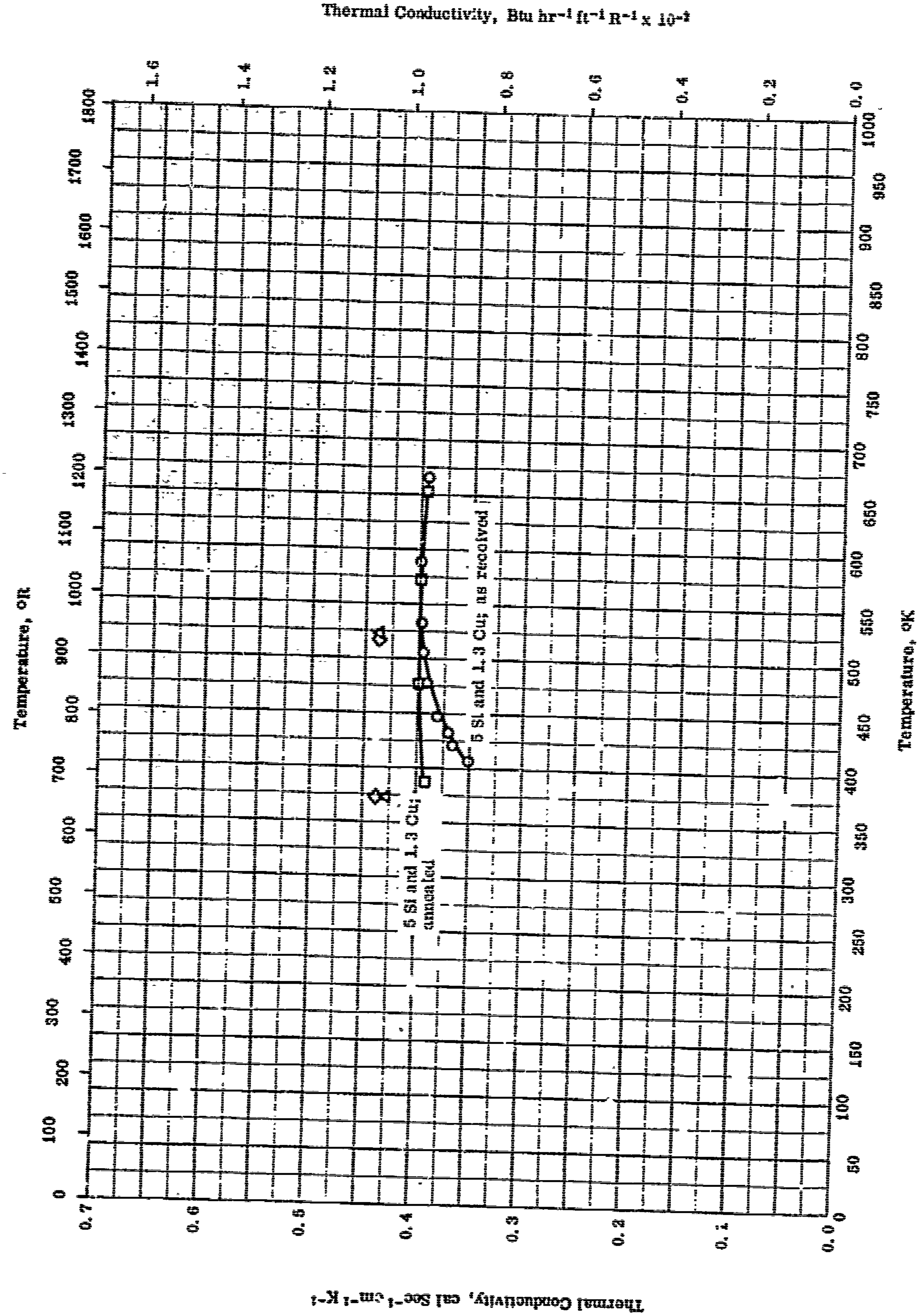


THERMAL CONDUCTIVITY — ALUMINUM + SILICON + ΣX_i
(2 - 2.5 Si)

THERMAL CONDUCTIVITY -- ALUMINUM + SILICON + ΣX_i
(2 - 2.5 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-573		Al Alloy RR53C (British design); 2.42 Si, 1.33 Cu, 1.12 Fe, 0.87 Ni, 0.60 Mg, 0.16 Ti.	Cast, as received.
□	49-2	293-573		Same as above.	Cast; held 2 hrs at 530 C, water quenched, and then held 15 hrs at 165 C.
△	49-2	293		Al Alloy RR50C (British design); 2.25 Si, 1.40 Cu, 1.18 Fe, 0.90 Ni, 0.19 Ti, 0.12 Mg.	Cast; as received.
◇	49-2	293-573		Same as above.	Cast; held 10 hrs at 165 C, and air cooled.

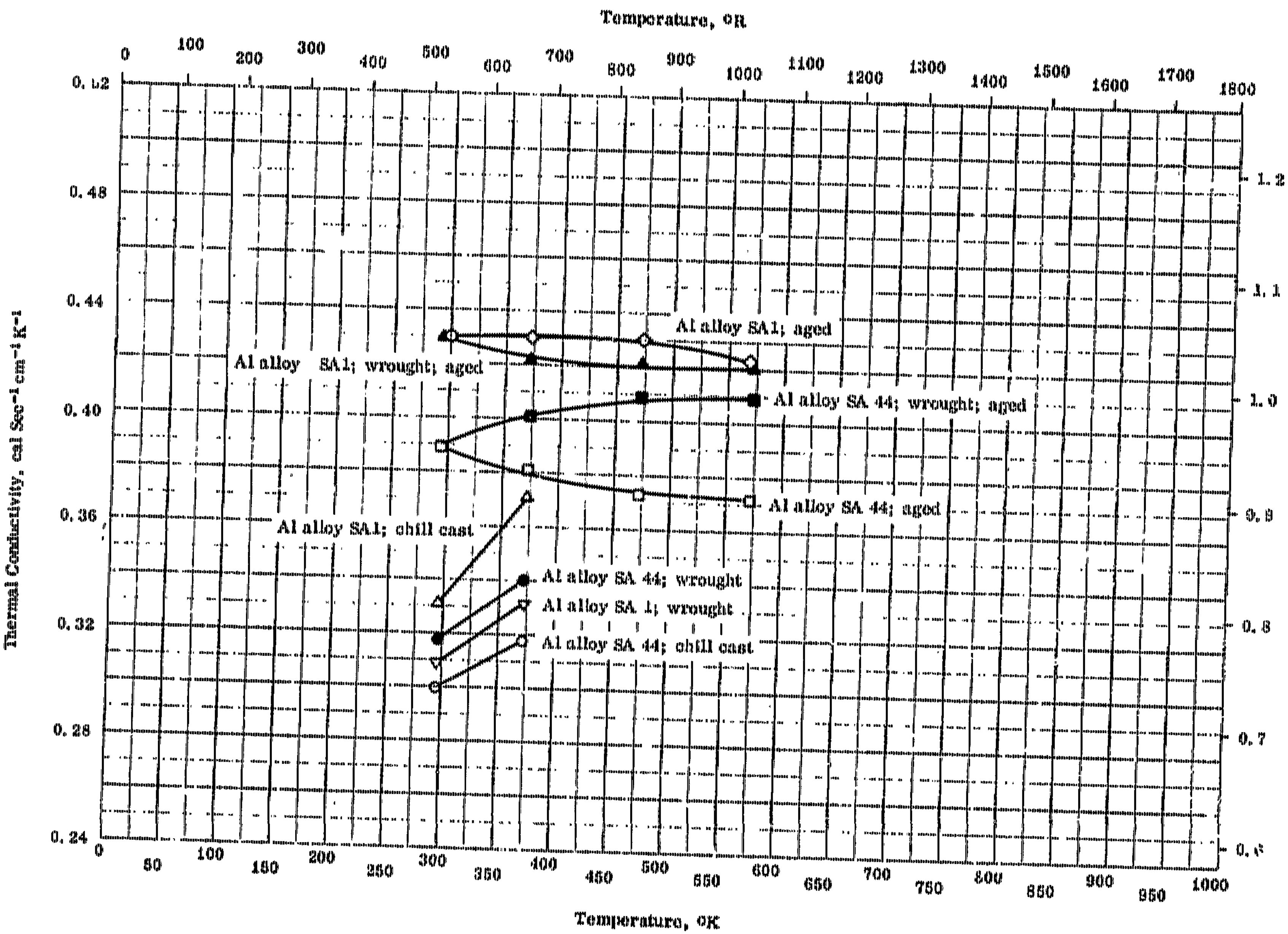


THERMAL CONDUCTIVITY -- ALUMINUM + SILICON + ΣX_i
(5 - 6 Si)

THERMAL CONDUCTIVITY -- ALUMINUM + SILICON + ΣX_i
(5-6 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-3	388-666	±4	5.0 Si, 1.3 Cu, 0.5 Mg.	Run 1; heated from virgin conditions to max. temp. of 707 F.
□	51-3	388-666	±4	Same as above.	After cooling to room temp. and repeating.
△	51-4	373-523	±3	91.79 Al, 5.5 Si, 1.43 Cu, 0.42 Mg, 0.41 Fe, 0.27 Mn, 0.14 Zn, 0.04 Ti; heavily gassed.	Annealed for 1 hr at 500 C, 23 hrs at 400 C, and 40 hrs at 300 C.
◇	51-4	373-523	±3	Same as above; not gassed.	Same as above.

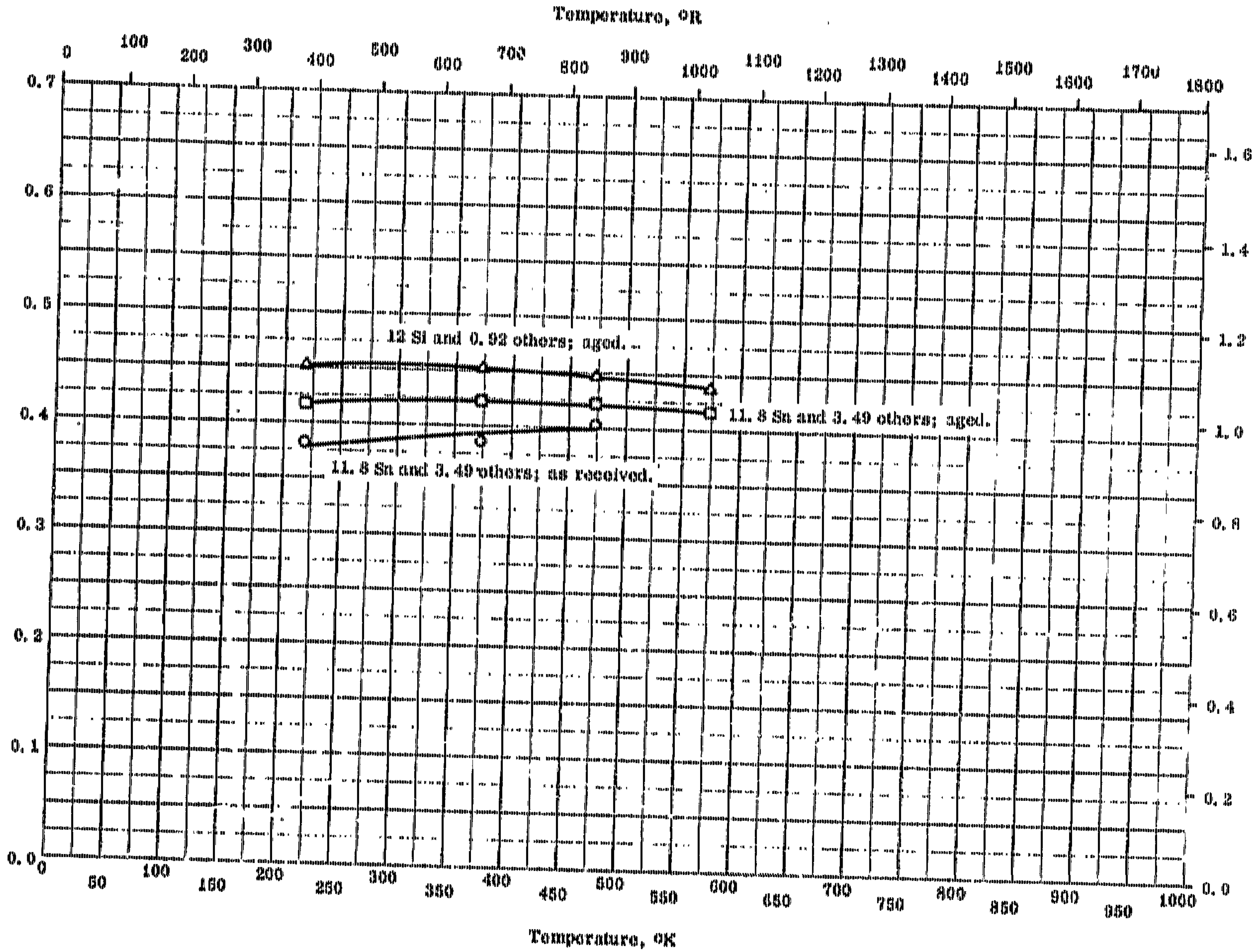


THERMAL CONDUCTIVITY — ALUMINUM + SILICON + ΣX_i
(11 Si)

THERMAL CONDUCTIVITY -- ALUMINUM + SILICON + ΣX_i
(11 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-2	293-373		Aluminum Alloy SA 44 (British design.); 11.0 Si, 5.0 Cu, 0.5 Mg, 0.5>Fe, 0.4 Mn, 0.3 Co, 0.1 Ti.	Chill cast.
□	49-2	293-573		Same as above.	Chill cast; heated 3 hrs at 500 C, cold water quenched and aged 10 hrs at 165 C.
●	49-2	293-373		Same as above.	Wrought.
■	49-2	293-573		Same as above.	Wrought; heated 3 hrs at 495 C - 500 C, cold water quenched, aged 16 hrs at 165 C and air cooled.
△	49-2	293-373		Aluminum Alloy SA 1 (British design.); 11.0 Si, 5.0 Cu, 0.6 Mg, Fe < 0.5; 0.2 Co, 0.05 Ti.	Chill cast.
◇	49-2	293-573		Same as above.	Chill cast; heated 3 hrs at 495 C - 500 C, cold water quenched, aged 10 hrs at 165 C.
▽	49-2	293-373		Same as above.	Wrought.
▲	49-2	293-573		Same as above.	Wrought; heated 3 hrs at 495 C - 500 C, cold water quenched, aged 16 hrs at 165 C, air cooled.

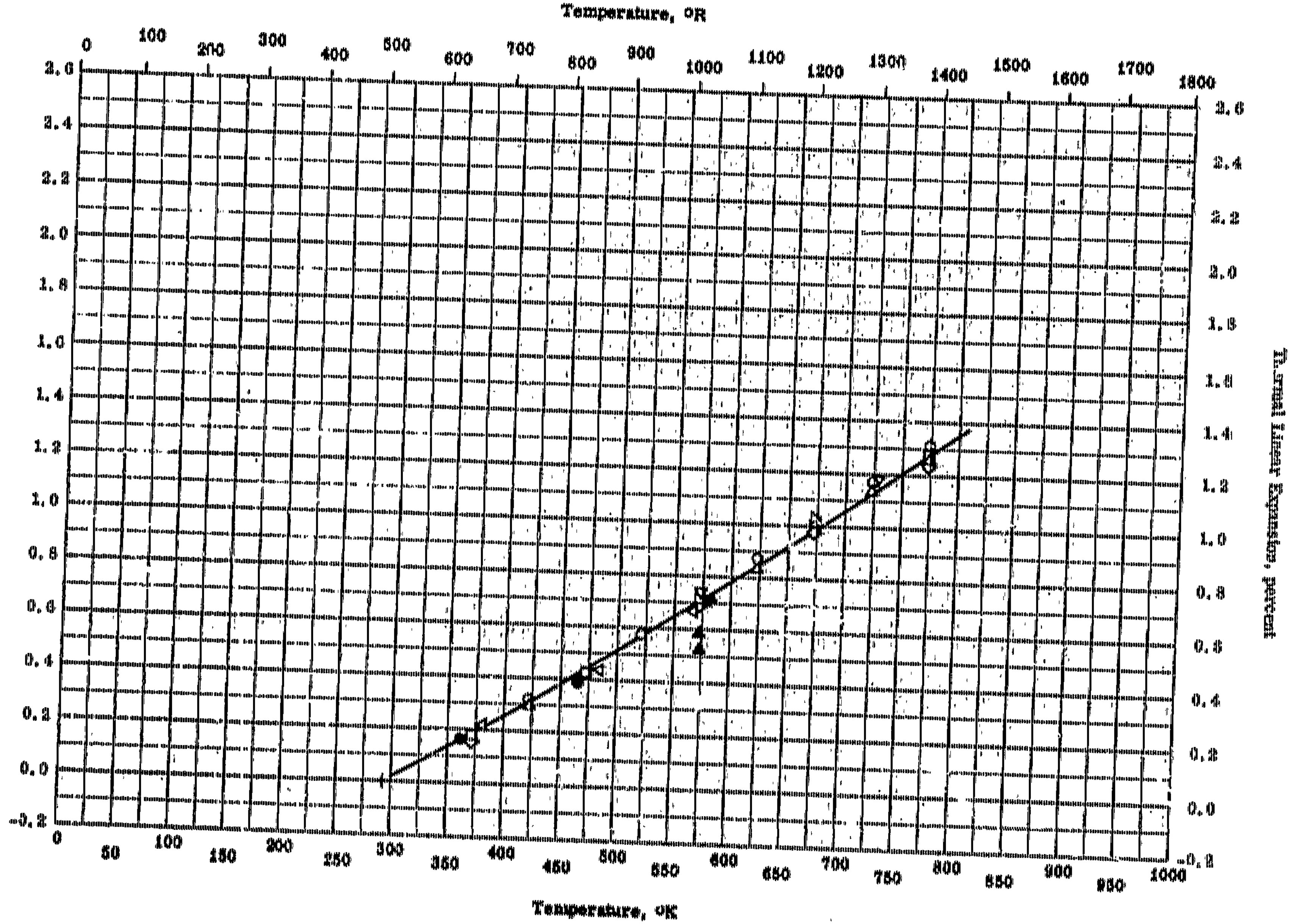


THERMAL CONDUCTIVITY -- ALUMINUM + SILICON + ΣX_i
(11.5 - 12 Si)

THERMAL CONDUCTIVITY — ALUMINUM + SILICON + ΣX_i
(11.5–12 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	40-2	293-473		Al alloy Lo-Ex (British design.); 11.80 Si, 1.03 Cu, 1.02 Ni, 0.91 Mg, 0.50 Fe, 0.03 Mn, 0.02 Ti.	Wrought, as received.
□	49-2	293-573		Same as above.	Wrought; held 12 hrs at 520 C, quenched, aged 4 hrs at 135 C, cooled in air, aged 4 hrs at 200 C, and then air cooled.
△	49-2	293-573		Aluminum Alloy Alpax Gamma (British design.); 12.0 Si, 0.36 Mg, 0.24 Mn, and 0.28 Fe.	4 hrs at 510 - 18 C, water quenched, and then heated 16 hrs at 150 - 165 C.

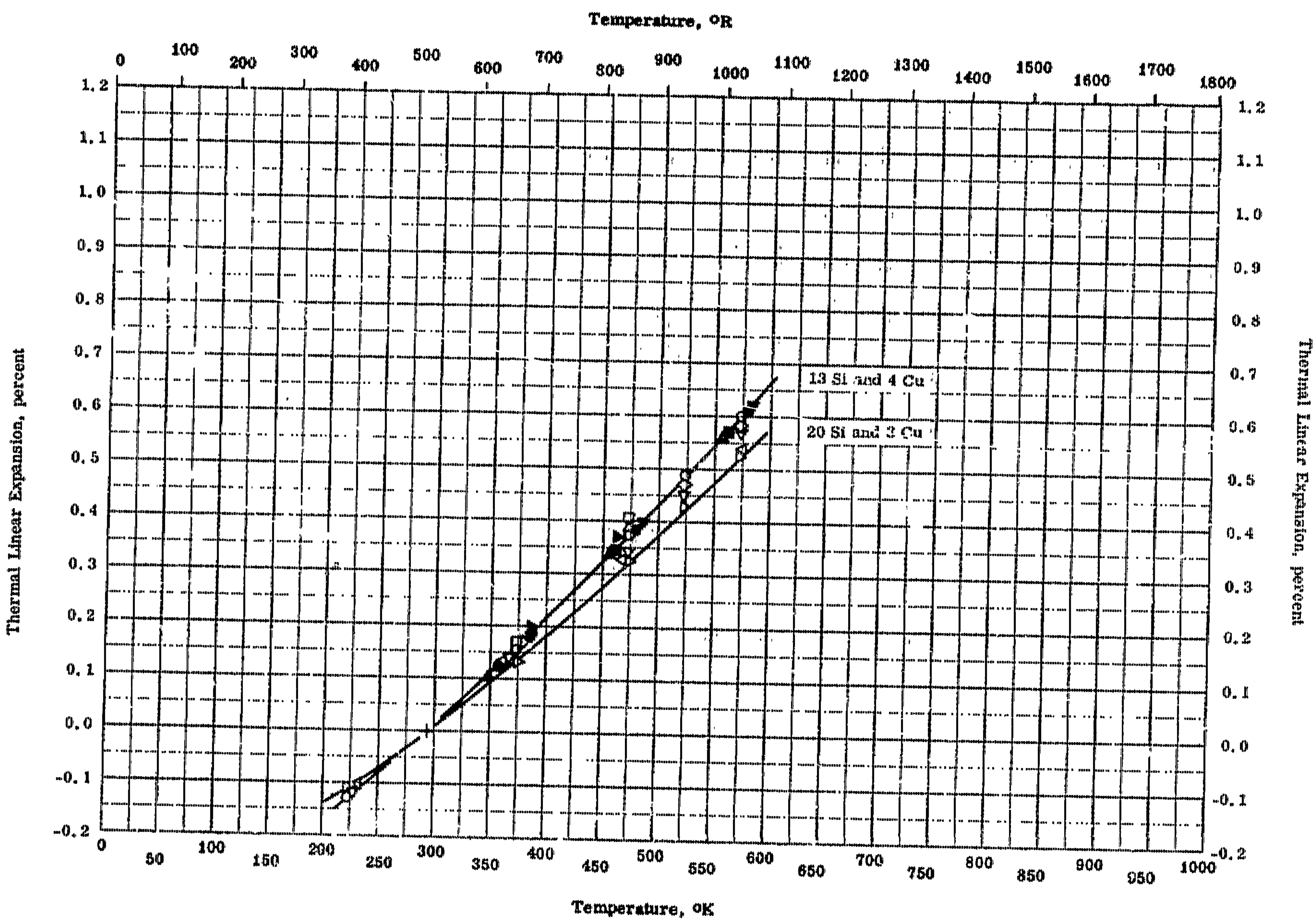


THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + EX_1
(2-6 Si and 1-4 Cu)

THERMAL LINEAR EXPANSION — ALUMINUM + SILICON + ΣX$_i$
(2 – 6 Si and 1 – 4 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, K	Ref. Error %	Sample Specifications	Remarks
○	48-1	293-773		3.06 Si, 1.04 Cu, 0.16 Fe, 0.08 Zn, 0.02 Ti, and traces of Mg and Mn.	Cast, held 6 hrs at 520 C, water quenched, annealed by heating to 520 C at 1.5 C min^{-1}, cooling at same rate; temp. measured by noting expansion of calibrated Al rod.
□	48-1	293-773		3.95 Si, 1.04 Cu, 0.15 Fe, 0.08 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
△	48-1	293-773		5.00 Si, 1.03 Cu, 0.10 Fe, 0.08 Zn, 0.08 Ti, and traces of Mg and Mn.	Same as above.
◇	48-1	293-773		6.04 Si, 1.05 Cu, 0.10 Fe, 0.08 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
▷	48-1	293-773		3.08 Si, 2.05 Cu, 0.16 Fe, 0.08 Zn, 0.02 Ti, and traces of Mg and Mn.	Same as above.
▽	48-1	293-773		4.0 Si, 3.10 Cu, 0.18 Fe, 0.08 Zn, 0.08 Ti, and traces of Mg and Mn.	Same as above.
◁	49-2	373-573		Al Alloy RR53C (British design.): 2.42 Si, 1.53 Cu, 1.13 Fe, 0.87 Ni, 0.80 Mg, and 0.10 Ti.	Cast, heated 2 hrs at 530 C, water quenched, and heated 18 hrs at 160-170 C.
●	49-2	373-573		Al Alloy RR50 (British design.): 2.30 Si, 1.40 Cu, 1.10 Fe, 0.90 Ni, 0.30 Ti, and 0.15 Mg.	Cast, heated 10 hrs at 160-170 C, air-cooled.
▲	54-31	293-573		Al Alloy: 5.5 Si, 3 Cu, 1.0 Mn, and 0.4 Ti, Mg each.	Quenched at 520 C, and aged at 160-170 C for 20 hrs.

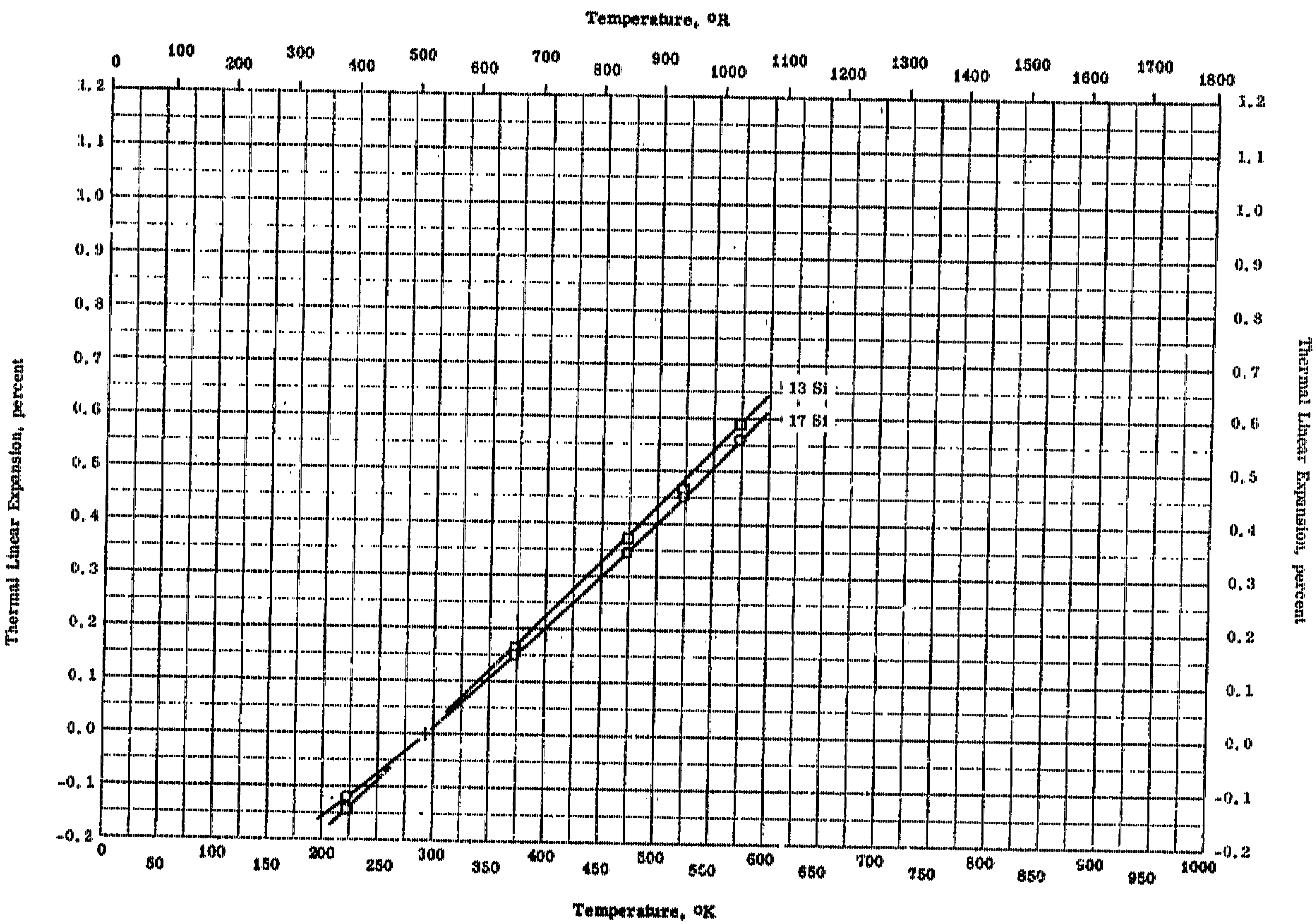


THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(10 - 21 Si and 1 - 10 Cu)

THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(10 - 21 Si and 1 - 10 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	223-573		81.80 Al, 13.35 Si, 4.03 Cu, and 0.82 Fe.	Normalized 1 hr at 400 C and cooled slowly.
□	52-19	293-473		80.45 Al, 10.16 Si, 9.08 Cu, and 0.31 Fe.	Cast in iron mold.
△	52-19	293-473		Same as above.	Heated to 750 F and cooled very slowly; heating and cooling test data graphically identical.
◇	52-19	293-573		78 Al, 13.35 Si, 7.91 Cu, and 0.74 Fe.	Normalized 1 hr at 400 C, cooled slowly.
▽	52-19	223-573		75.6 Al, 10.23 Si, 9.78 Cu, 3.91 Ni, and 0.42 Fe.	Same as above.
▷	52-19	223-573		74.5 Al, 20.29 Si, 3.18 Cu, 1.07 Mn, and 0.96 Fe.	Same as above.
◁	52-19	223-573		73.89 Al, 13.19 Si, 8.02 Cu, 4.10 Ni, and 0.80 Fe.	Same as above.
●	49-2	373-573		Al Alloy RAE SA1 (British design.); 11.0 Si, 5.0 Cu, 0.6 Mg, < 0.5 Fe, 0.2 Co, and 0.05 Ti.	Wrought, heated 3 hrs at 500 C, cold water quenched, aged 16 hrs at 165 C, and air-cooled.
■	49-2	373-573		Same as above.	Chill cast; same as above.
▲	49-2	373-573		Al Alloy RAE SA 44 (British design.); 11.0 Si, 5.0 Cu, 0.5 Mg, < 0.5 Fe, 0.4 Mn, 0.3 Co, and 0.1 Ti.	Wrought; same as above.
▼	49-2	373-573		Same as above.	Chill cast; same as above.
▶	49-2	373-573		Al Alloy Lo-Ex (British design.); 11.80 Si, 1.03 Cu, 1.02 Ni, 0.91 Mg, 0.50 Fe, 0.03 Mn, 0.02 Ti.	Wrought, heated 12 hrs at 520 C, quenched, aged 4 hrs at 135 C, air-cooled, aged 4 hrs at 200 C, and air-cooled.

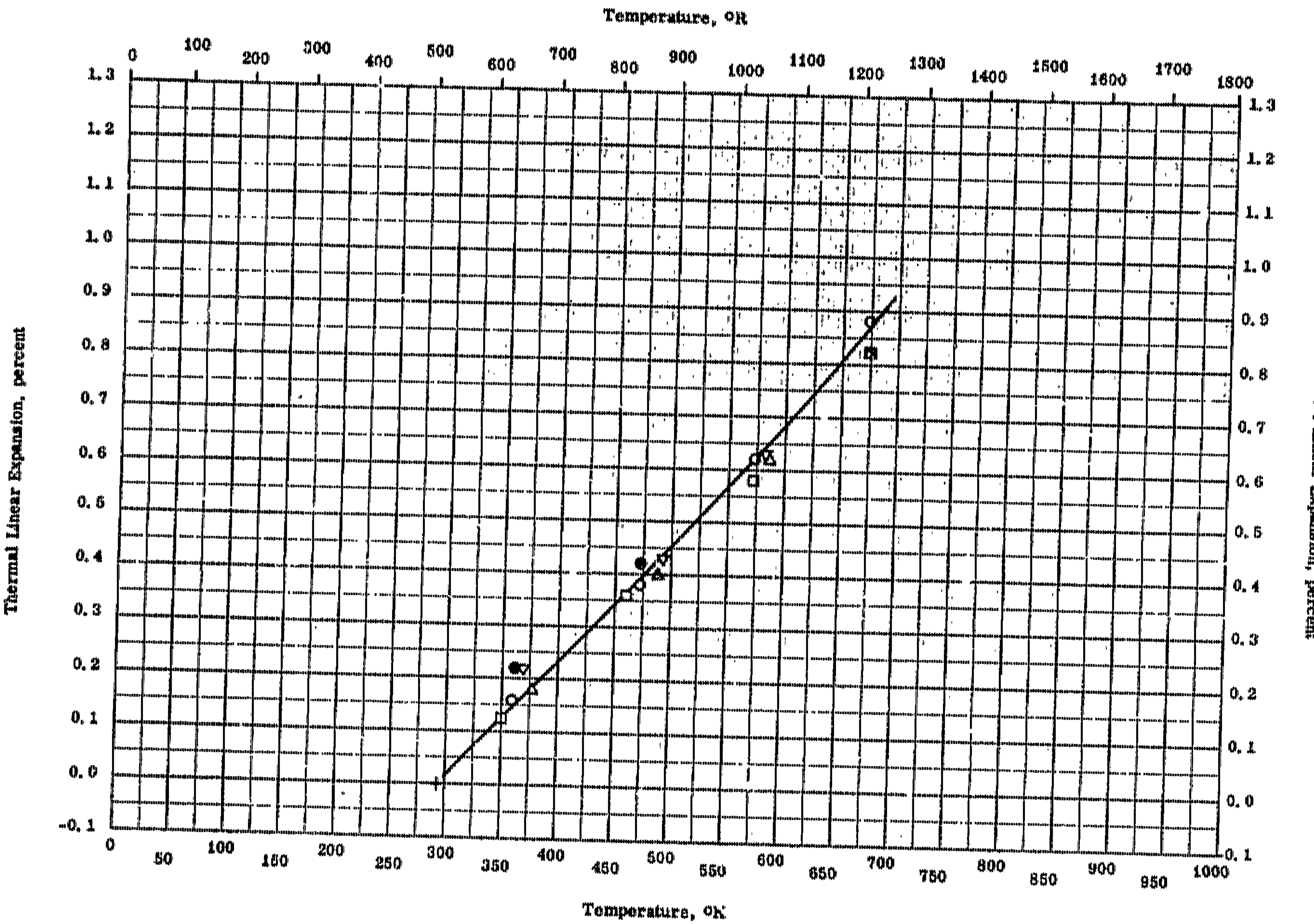


THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(13 - 18 Si and 0.7 - 1.0 Fe)

THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(13 - 18 Si and 0.7 - 1.0 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	223-573		81.80 Al, 17.27 Si, 0.81 Fe, and 0.12 Cu.	Normalized 1 hr at 400 C and cooled slowly.
□	52-19	223-573		86.01 Al, 13.08 Si, 0.76 Fe, and 0.15 Cu.	Same as above.

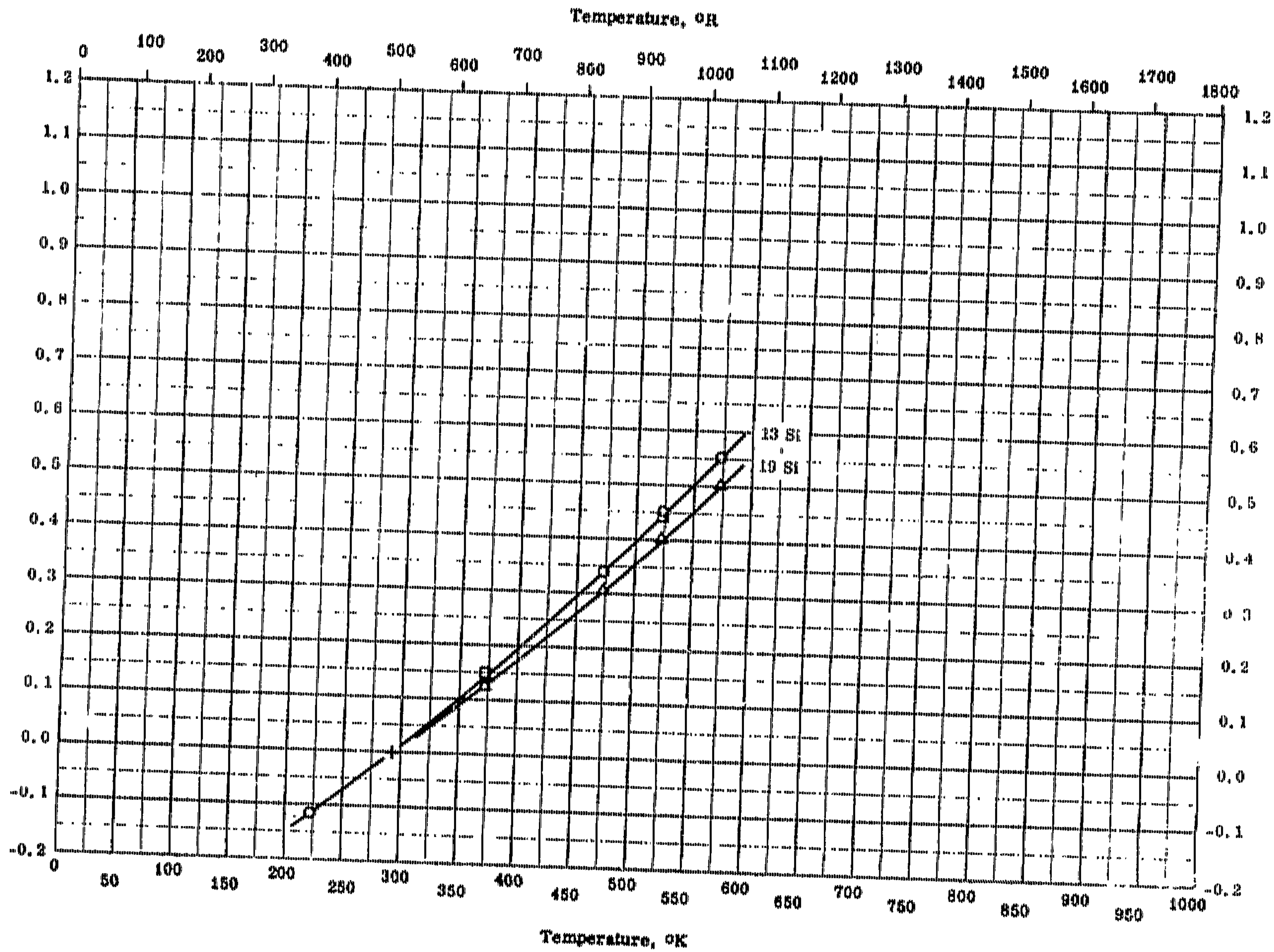


THERMAL LINEAR EXPANSION — ALUMINUM + SILICON + ΣX_i
(12 Si and 0.3 - 1.2 Mg)

THERMAL LINEAR EXPANSION — ALUMINUM + SILICON + ΣX_i
(12 Si and 0.3 – 1.2 Mg)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	293-673		84.40 Al, 12.18 Si, 1.20 Mg, 0.89 Cu, 0.87 Ni, 0.41 Fe, 0.02 Zn, 0.01 Mn, 0.01 Cr, and 0.01 Ti.	Solution heat treated 1 hr at 900 F, water quenched and aged at 340 F; heating.
●	52-19	293-673		Same as above.	Cooling.
□	52-19	293-673		Same as above.	Same as above; then aged 100 hrs at 700 F; heating and cooling curves graphically identical.
△	52-19	293-673		Same as above.	Same as above; but aged 500 hrs at 800 F; heating and cooling curves graphically identical.
▽	49-2	293-573		Al Alloy Alpax gamma (British design.); 12.0 Si, 0.35 Mg, 0.29 Mn, and 0.28 Fe.	Cast, heated 4 hrs at 510-518 C, cold water quenches, and heated 16 hrs at 150-166 C.



THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(12 - 20 Si and 4 - 5 Ni)

THERMAL LINEAR EXPANSION -- ALUMINUM + SILICON + ΣX_i
(12 - 20 Si and 4 - 5 Ni)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-19	223-573		77.83 Al, 13.22 Si, 4.12 Ni, 4.05 Cu, and 0.78 Fe.	Normalized 1 hr at 400 C, cooled slowly.
□	52-19	223-573		76.59 Al, 12.68 Si, 4.44 Ni, 4.13 Cu, 1.36 Mn, and 80 Fe.	Same as above.
△	52-19	293-573		71.40 Al, 19.30 Si, 4.18 Ni, 3.14 Cu, 1.08 Mn, and 0.84 Fe.	Same as above.

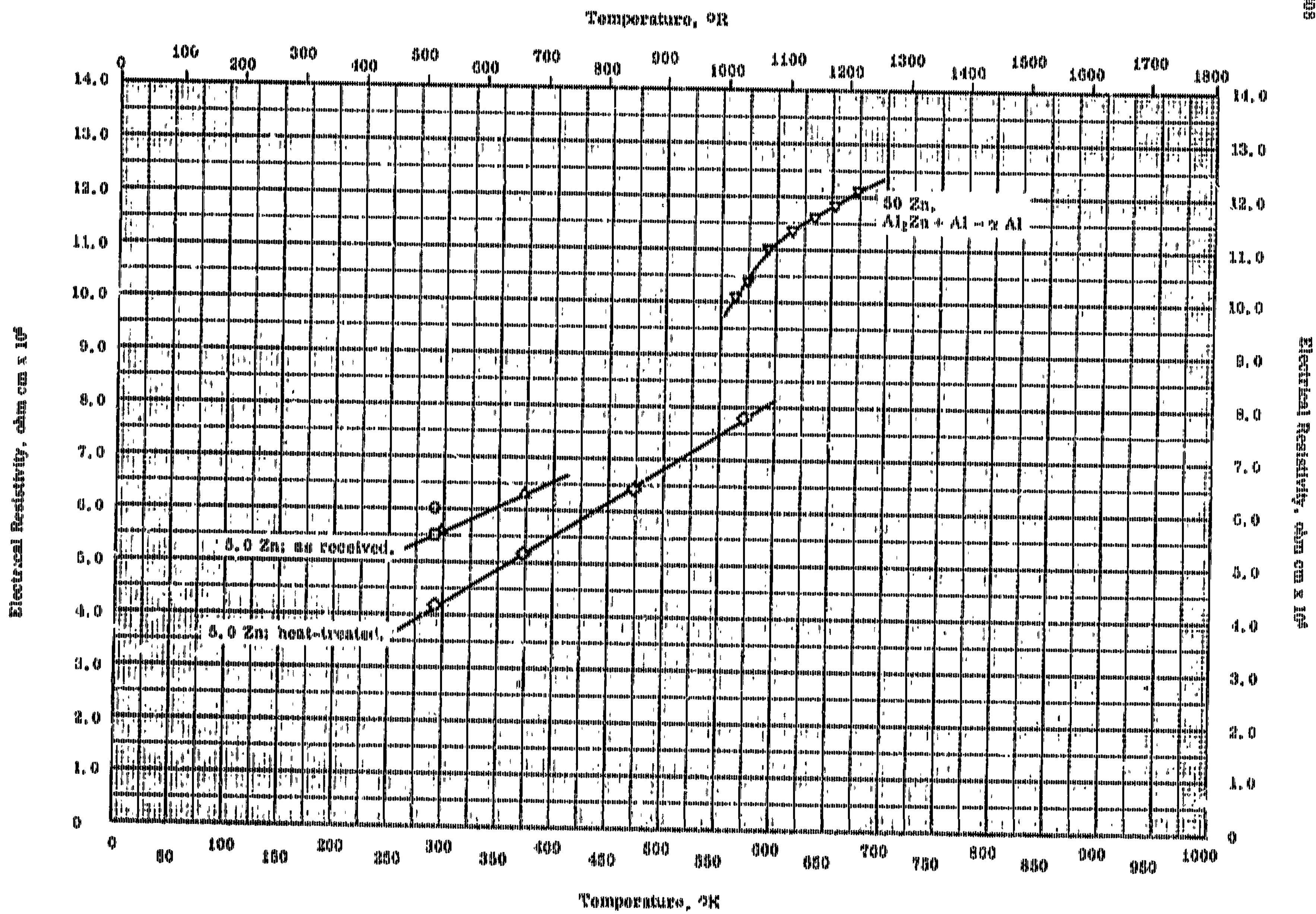
PROPERTIES OF ALUMINUM + ZINC + ΣX_i

REPORTED VALUES

Density:		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	Alloy 7075-T6	2.801	174.9
□	L'A Z5G	2.80	175
Melting Point:		K	R
△	L'A Z5G	873	1572
Heat of Fusion:		$cal\ g^{-1}$	$Btu\ lb^{-1}$
▽	L'A Z5G	93	167

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	293		Alloy 7075-T6; 5.6 Zn, 2.5 Mg, 1.6 Cu, and 0.3 Cr; nominal composition.	Density by weight and volume by water displacement.
□	56-5	298		French alloy L'A- Z5G; 4.5-5.5 Zn, 0.4-0.65 Mg, 0.15-0.35 each Cu and Cr, 0.15-0.25 Ti, 0.8 > Fe, 0.4 > Mn, 0.3 > Si and 0.05 > Ni.	Casting alloy; fully aged.
△	56-5	1573		Same as above.	Same as above.
▽	56-5	1572		Same as above.	Same as above.

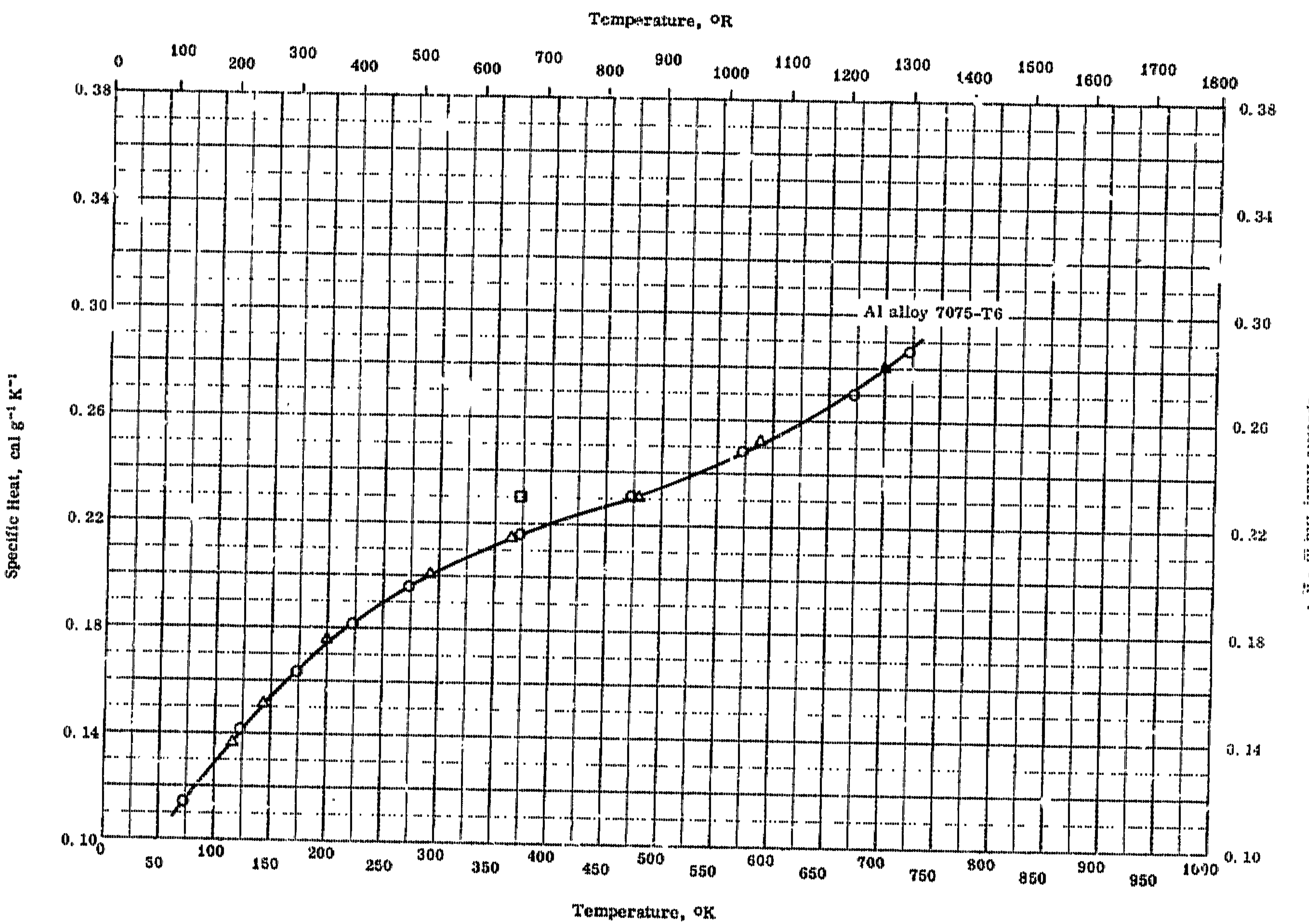


ELECTRICAL RESISTIVITY -- ALUMINUM + ZINC + ΣX$_i$

ELECTRICAL RESISTIVITY — ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, K	Rept. Error %	Sample Specifications	Remarks
○	56-5	293		Al - Zn alloy L'A - 250; nominal: 4.8 - 5.6 Zn, 0.8 > Fe, 0.4 - 0.65 Mg, 0.4 > Mn, 0.18 - 0.35 each Cu, Cr, 0.3 > Si; 0.15 - 0.30 Ti and 0.03 > Ni; density 173 lb ft^{-3}.	Fully aged.
□	56-6	293		Same as above.	Normalized at 160 C.
△	49-2	293-473		Al alloy RR77 (British designation): 4.98 Zn, 2.54 Mg, 2.80 Cu, 0.54 Mn, 0.31 Fe, 0.20 Si and trace of Ti.	Wrought, as received.
◇	49-3	293-473		Same as above.	Wrought, solution heat treated 2 hrs at 450 C, quenched in water at 70 C, aged 4 hrs at 135 C, and air cooled.
▽	58-34	563-673		48.9 Zn; made from Al with 0.003 Fe, 0.001 each Si, Cu, Mg; Zn with 0.003 each Fe, Pb, 0.001 each Cu, Mg, Cd.	Melted, pressed, wire drawn, and annealed 48 hrs at 370 C and held 2 hrs at 400 C.

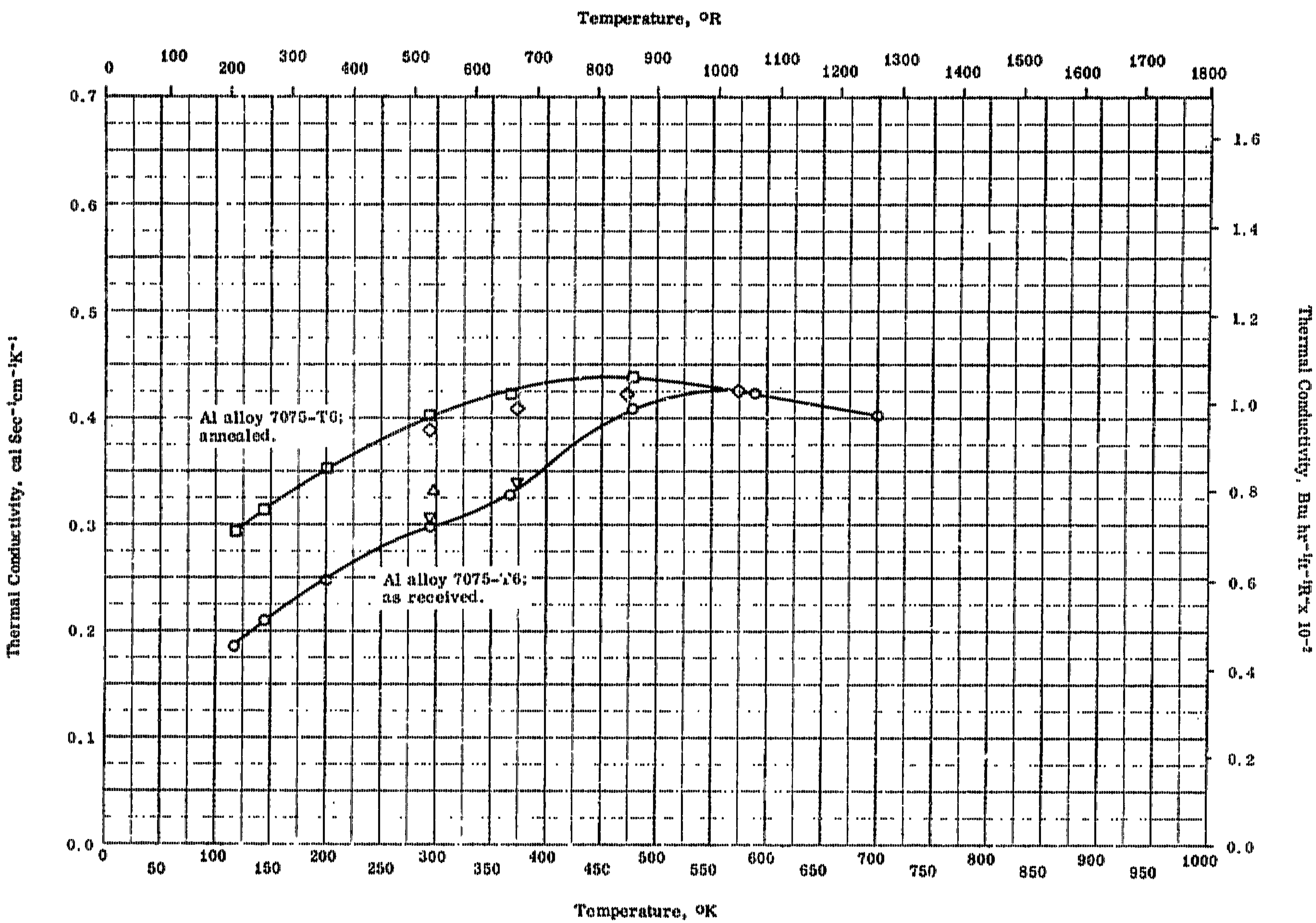


SPECIFIC HEAT -- ALUMINUM + ZINC + ΣX_i

SPECIFIC HEAT -- ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

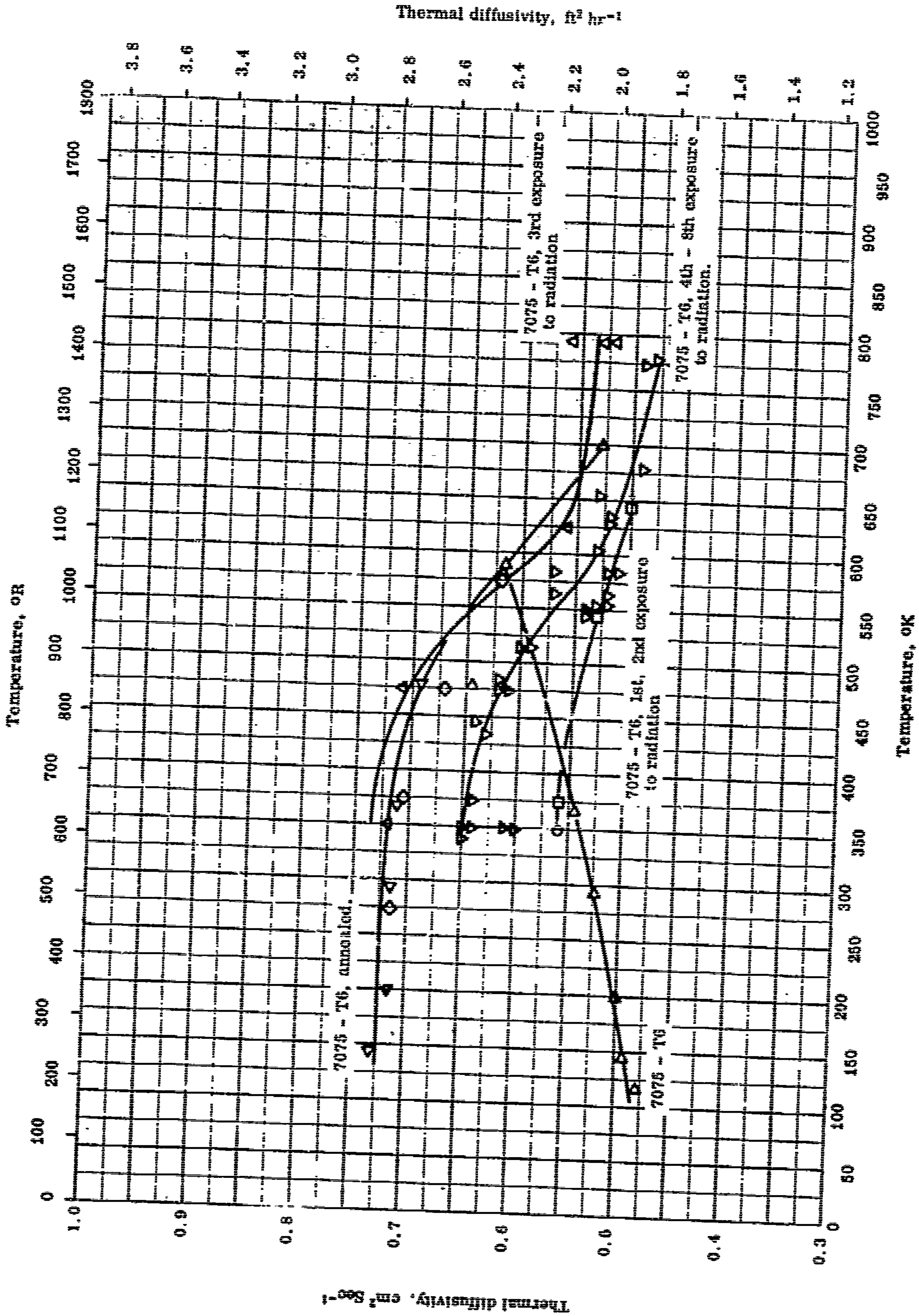
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-13	78-736		Al alloy 75 S - T 6; 90 Al, 5.5 Zn, 2.5 Mg, 1.5 Cu, 0.3 Cr and 0.2 Mn.	
□	56-5	373		Alloy L'A - Z 56 (French design); 4.5 - 5.5 Zn, 0.4 - 0.65 Mg, 0.15 - 0.35 each Cu, Cr, 0.15 - 0.25 Ti, < 0.8 Fe, <0.4 Mn, and < 0.3 Si; density 175 lb ft^{-3}.	Fully aged.
△	58-1	116-700		Al alloy 7075 - T 6; nominal composition; 90.2 Al, 5.5 Zn, 2.5 Mg, 1.5 Cu, and 0.3 Cr.	Sealed under helium atmosphere.



THERMAL CONDUCTIVITY -- ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

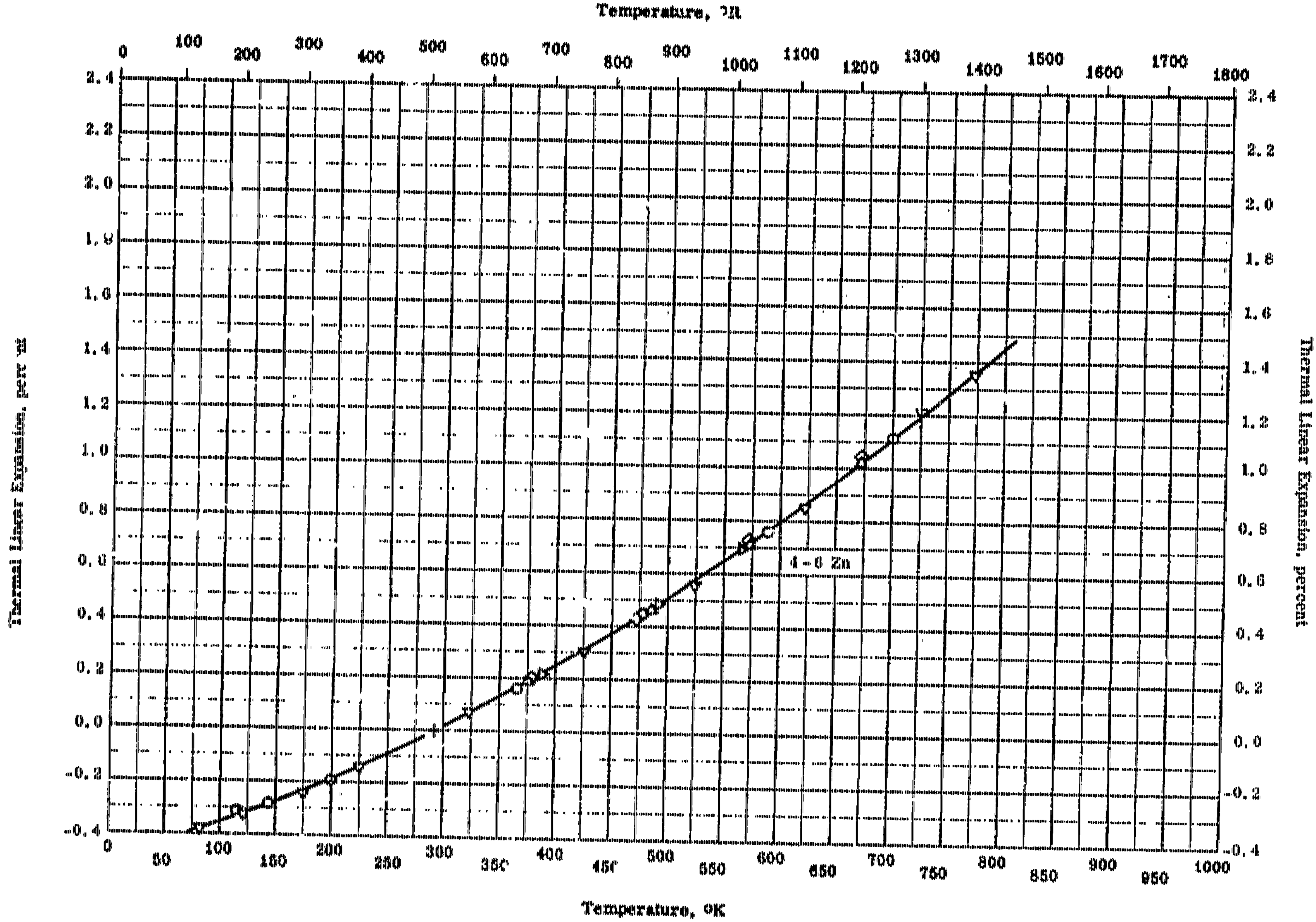
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	117-700		7075 - T6 (Alcoa); 5.6 Zn, 2.5 Mg, 1.6 Cu, 0.3 Cr; density 175 lb ft^{-3}.	As received.
□	58-1	117-700		Same as above.	After heating above 575 F.
△	56-5	298		Alloy L'A-Z5G (French design); 4.5 - 5.5 Zn, 0.4 - 0.65 Mg, 0.15 - 0.35 ea. Cu, Cr, 0.15 - 0.25 Ti, 0.8>Fe, 0.4>Mn, 0.3>Si, 0.05>Ni; density 175 lb ft^{-3}.	Fully aged.
◇	49-2	293-573		Wrought alloy RR77 (British design); 4.96 Zn, 2.54 Mg, 2.20 Cu, 0.54 Mn, 0.31 Fe, 0.26 Si, trace Ti.	Solution heat treated 2 hrs at 450 C, quenched in water at 70 C, aged 4 hrs at 135 C, and aircooled.
▽	49-2	293-573		Same as above.	As received.



THERMAL DIFFUSIVITY -- ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

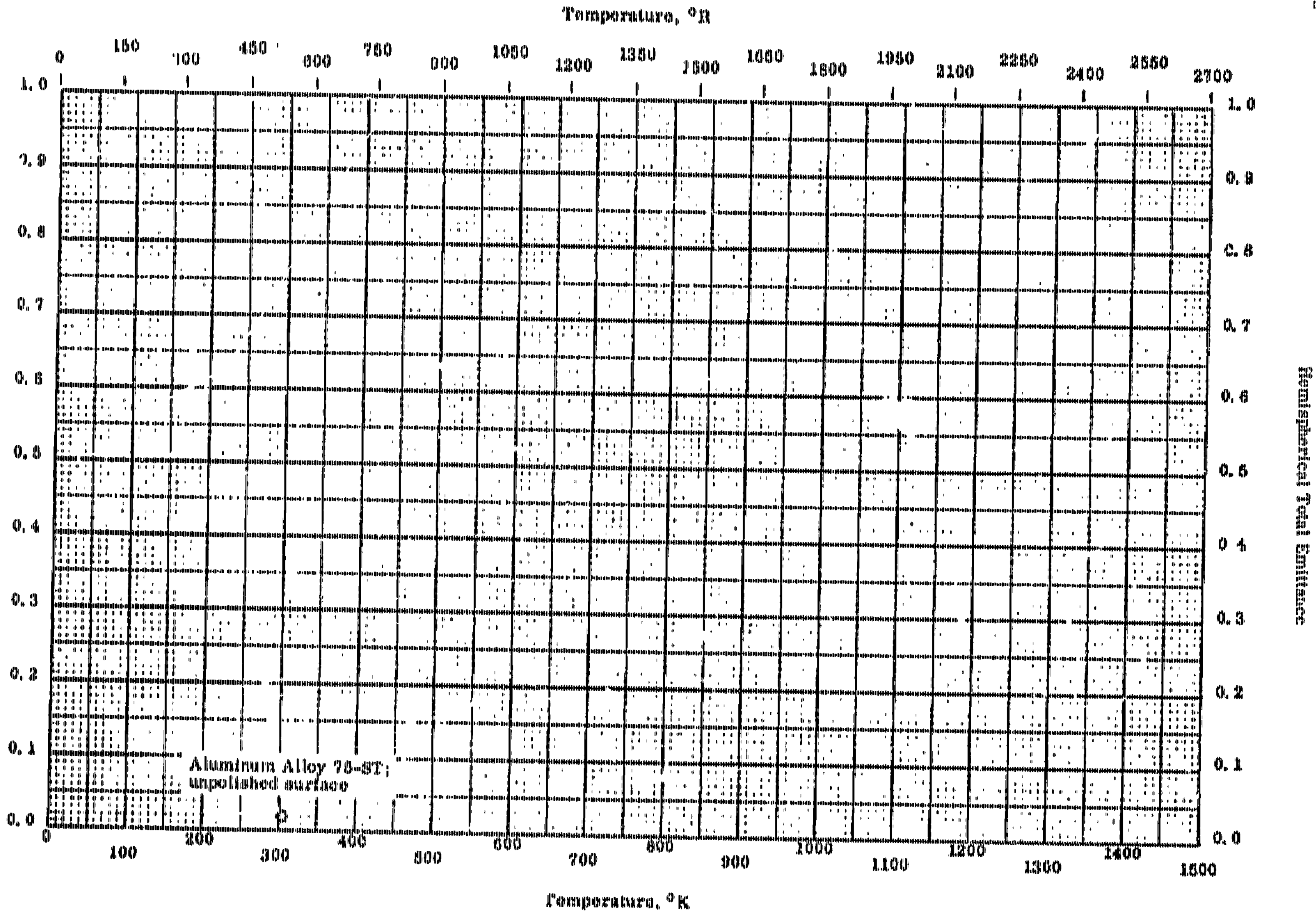
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-1	348		7075-T6; 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.40 Cr, 0.30 Mn, 0.2 Ti, and 0.05 max each and 0.15 max others; composition from Handbook. (Author desig.: 2)	Measured after exposure to radiation and followed by cooling.
□	57-1	373-643		Same as above	Measured after another exposure to radiation and followed by cooling.
△	57-1	348-793		Same as above	Measured after the third cycle of exposure.
▽	57-1	338-778		Same as above	Averaged values on measurements after from fourth to eighth exposure cycles.
▷	58-1	116-700		7075-T6; 5.6 Zn, 2.5 Mg, and 1.6 Cu.	As received.
◁	58-1	144-700		Same as above	The above sample heated above 302 C.
◇	58-1	273-673		75S; 5.6 Zn, 2.5 Mg, 1.5 Cu, 0.3 Cr, and 0.20 Mn.	Annealed at 450 C.



THERMAL LINEAR EXPANSION — ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	117-700		Alloy 7075-T6 (Alcoa); nominal: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 1.2 - 2.0 Cu, 0.7 Fe, and 0.5 Si.	Tested in vacuum.
△	50-5	293-673		Alloy No. L.A-25G; nominal: 4.5 - 5.5 Zn, 0.4 - 0.65 Mg, 0.15 - 0.35 each Cu, Cr, 0.15 - 0.25 Ti, 0.8 > Fe, 0.4 > Mn, 0.3 > Si, and 0.05 > Ni; density 175 lb ft^{-3}.	Cast; fully aged.
◇	56-5	293-673		Same as above.	Cast; normalized at 180 C.
▽	51-6	84-773		Al Alloy 75S-T6; 5.6 Zn, 2.5 Mg, 1.6 Cu, and 0.3 Cr; density 175 lb ft^{-3}.	Tested at 1.5 - 2.5 C min^{-1} rise in argon.
▷	49-2	373-573		Alloy RR77 (British design.); . . 96 Zn, 2.54 Mg, 2.20 Cu, 0.64 Mn, 0.31 Fe, 0.26 Si, and trace Ti.	Wrought, 2 hrs solution heat treatment at 450 C, quenched in water at 70 C, aged 4 hrs at 135 C, and air-cooled.

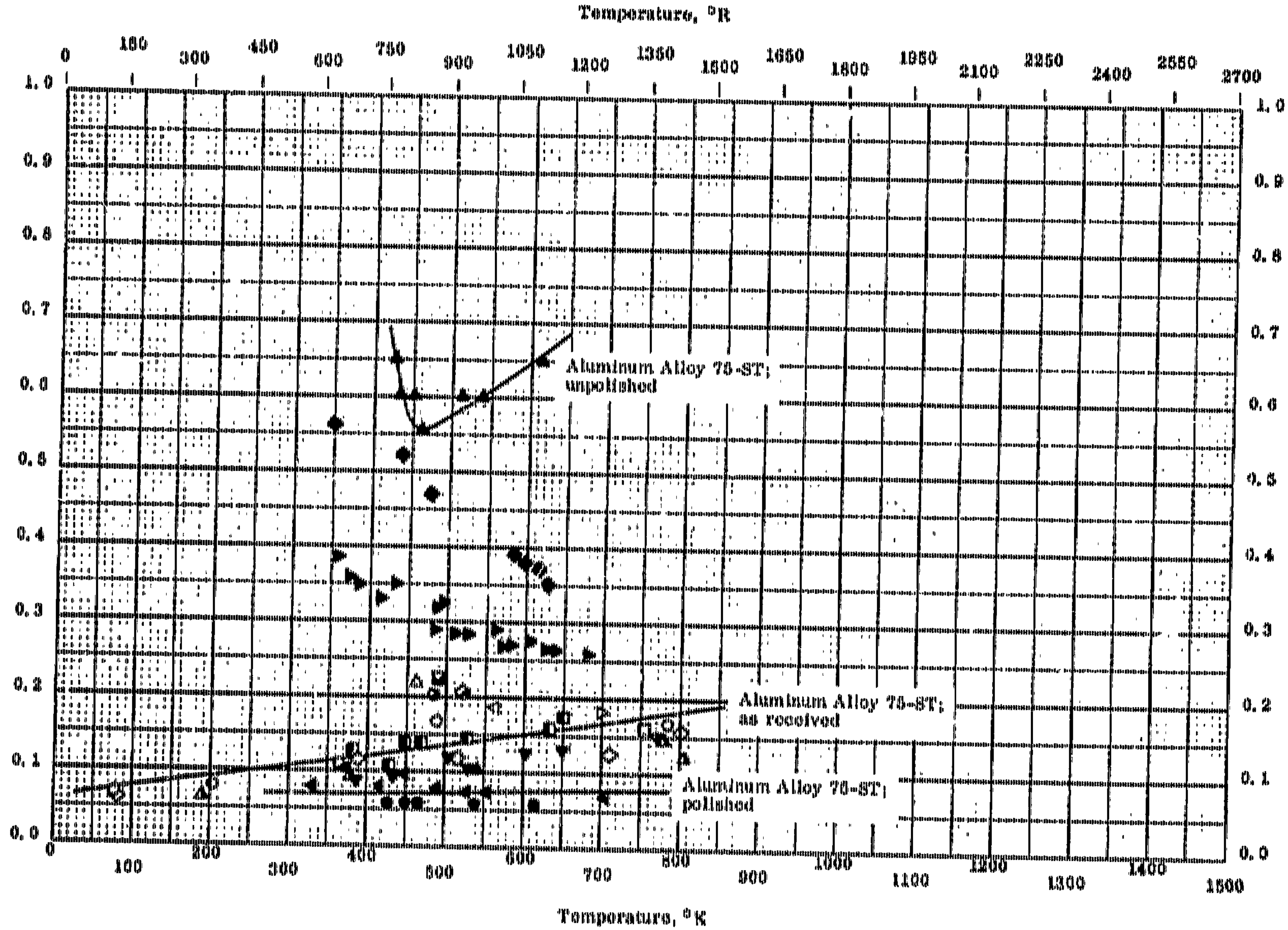


HEMISPHERICAL TOTAL EMITTANCE — ALUMINUM + ZINC + ΣX_i

HEMISPHERICAL TOTAL EMITTANCE -- ALUMINUM + ZINC + ΣX$_i$

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	48-7	303		75-ST, Alclad; nominal composition: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 0.7 Fe, 0.5 Si, 0.18 - 0.4 Cr, 0.3 Mn, and 0.2 Ti.	Unpolished surface; measured in air.



NORMAL TOTAL EMITTANCE — ALUMINUM + ZINC + ΣX$_i$

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-34	78-783		75-ST, Alclad; nominal composition: 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.4 Cr, 0.3 Mn and 0.2 Ti	As received; wiped; measured in helium (10 microns); cycle 1 heating.
△	55-34	401		Same as above.	Cycle 1 cooling.
□	55-34	755		Same as above.	Cycle 2 heating.
▽	55-34	400		Same as above.	Cycle 2 cooling.
◇	55-34	83-800		75-ST, Alclad; nominal composition: 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.4 Cr, 0.3 Mn and 0.2 Ti.	Washed and wiped; measured in helium (10 microns); cycle 1 heating.
◁	55-34	601		Same as above.	Cycle 1 cooling.
▷	55-34	700		Same as above.	Cycle 2 heating.
●	55-34	403		Same as above.	Cycle 2 cooling.
▲	55-34	78-778		75-ST, Alclad; nominal composition: 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.4 Cr, 0.3 Mn and 0.2 Ti.	Polished to a mirror-like finish and washed; measured in helium (10 microns); cycle 1 heating.
■	55-34	400		Same as above.	Cycle 1 cooling.
▼	55-34	772		Same as above.	Cycle 2 heating.
◆	55-34	622		Same as above.	Cycle 2 cooling.

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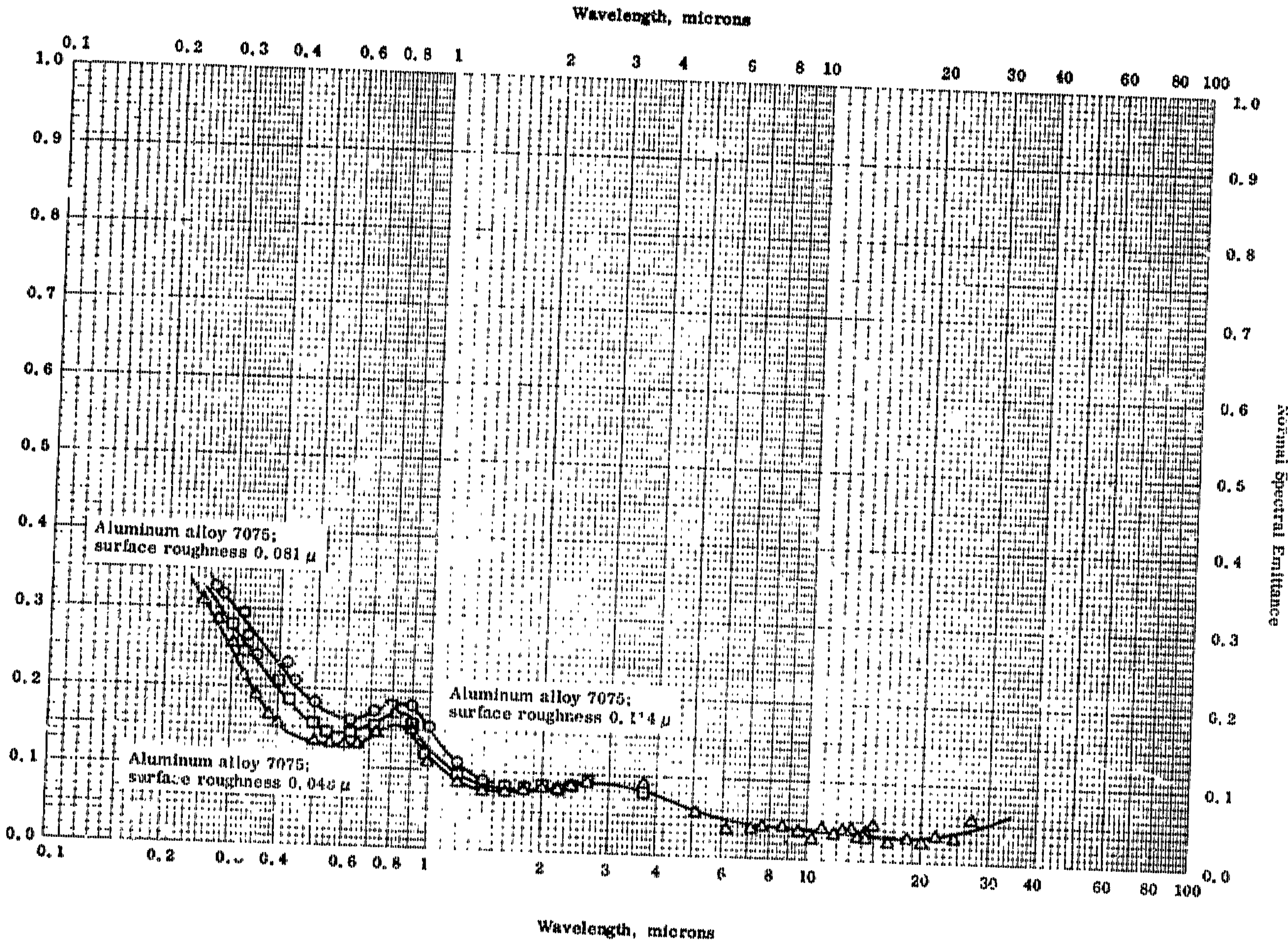
NORMAL TOTAL EMITTANCE -- ALUMINUM + ZINC + ΣX_i (continued)

REFERENCE INFORMATION

Sym bol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◀	54-27	373-705		75-ST, Alclad; nominal composition: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 1.2 - 2.0 Cu, 0.7 Fe, 0.5 Si, 0.18 - 0.4 Cr, 0.3 Mn and 0.2 Ti.	Polished; use polished flat shield during measurement.
▶	54-27	358-678		75-ST, Alclad; nominal composition: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 1.2 - 2.0 Cu, 0.7 Fe, 0.5 Si, 0.18 - 0.4 Cr, 0.3 Mn and 0.2 Ti.	Polished; use polished flat shield during measurement.
●	54-27	428-616		75-ST, Alclad; nominal composition: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 1.2 - 2.0 Cu, 0.7 Fe, 0.5 Si, 0.18 - 0.4 Cr, 0.3 Mn and 0.2 Ti.	Polished; use conical shield during measurement.
▲	54-27	428-619		75-ST, Alclad.	Unpolished.
◘	54-27	383-650		75-ST, Alclad.	Polished with Aerobright and BonAmi.
▼	54-27	386-650		75-ST, Alclad.	The above specimen, data taken on different days.
◆	54-27	353-628		75-ST, Alclad.	Anodized.

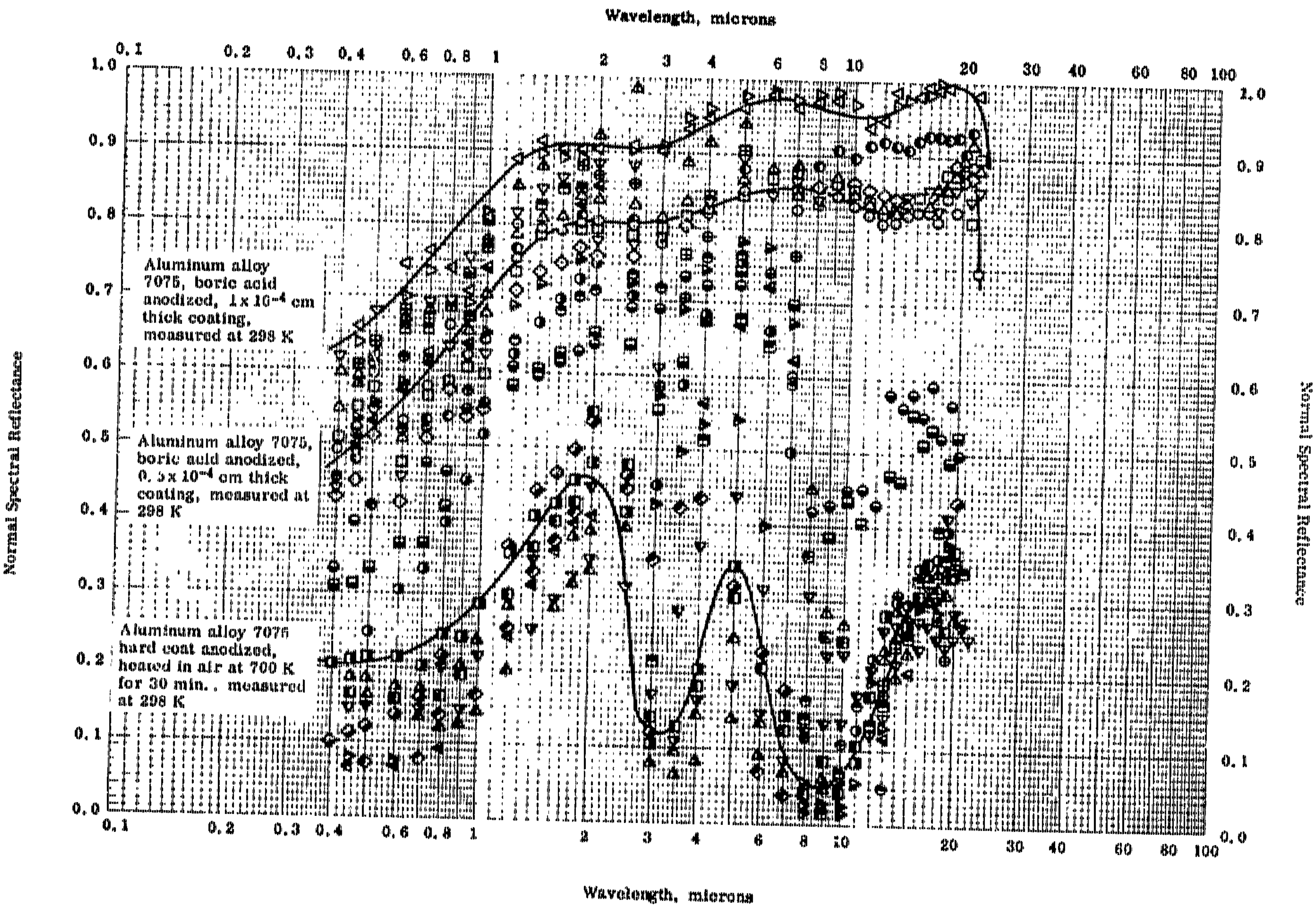


NORMAL SPECTRAL EMITTANCE -- ALUMINUM + ZINC + ΣX_i

NORMAL SPECTRAL EMITTANCE -- ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	63-18	323	0.27-1.4		Aluminum alloy 7075, nominal composition: 5.1 - 6.1 Zn, 2.1 - 2.9 Mg, 1.2 - 2.0 Cu, 0.7 Fe, 0.5 Si, 0.18 - 0.4 Cr, 0.3 Mn, and 0.2 Ti; surface roughness: 0.114 and 0.081 microns in x and y directions respectively.	Measured in nitrogen.
△	63-18	323	0.25-27		Aluminum alloy 7075; surface roughness: 0.048 and 0.064 microns in x and y directions respectively.	Measured in nitrogen.
□	63-18	323	0.3-3.7		Aluminum alloy 7075; surface roughness: 0.081 and 0.112 microns in x and y directions respectively.	Measured in nitrogen.



NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + ZINC + ΣX_i

NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	61-22	298	0.4-22.0		Aluminum alloy 7075, sample 52; nominal composition: 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.4 Cr, 0.3 Mn, and 0.2 Ti.	Mechanically and electropolished; boric acid anodized, 1×10^{-4} cm thick coating, in 10^{-6} mm Hg vacuum.
△	61-22	422	0.4-22.0		Same as above.	Same as above.
□	61-22	589	0.4-22.0		Same as above.	Same as above.
▽	61-22	714	0.4-22.0		Same as above.	Same as above.
◇	61-22	298	0.4-22.0		Same as above.	Same as above after high temperature runs.
◁	61-22	298	0.4-22.0		Same as above. [Author's design.: Sample 62].	Treated same as above; except shorted anodizing time (1/3 standard); 0.5×10^{-4} cm thick coating.
▷	61-22	298	0.4-22.0		Same as above. [Author's design.: Sample 54].	Mechanically polished and boric acid anodized; in 10^{-6} mm Hg vacuum.
◐	61-22	298	0.4-22.0		Same as above. [Author's design.: Sample 115].	Mill finished, electropolished, and boric acid anodized; in 10^{-3} mm Hg vacuum.
◭	61-22	298	0.45-20.0		Aluminum alloy 7075; nominal composition: 5.1-6.1 Zn, 2.1-2.9 Mg, 1.2-2.0 Cu, 0.7 Fe, 0.5 Si, 0.18-0.4 Cr, 0.3 Mn, and 0.2 Ti.	Mechanically polished and electropolished; hard coat anodized; in 10^{-6} mm Hg vacuum.
◧	61-22	298	0.45-20.0		Same as above. [Author's design.: Sample 86].	Treated as above and sealed.

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REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
▼	61-22	422	0.45-19.0		Same as above. [Author's design.: Sample 87].	Same as above.
◆	61-22	589	0.45-7.0		Same as above.	Same as above.
◀	61-22	714	0.45-3.0		Same as above.	Same as above.
▶	61-22	298	0.45-20.0		Same as above.	Same as above, after high temperature runs.
■	61-22	298	0.4-17.0		Same as above. [Author's design.: Sample 88].	Treated same as above and heated in air at 700 K for 30 min.
●	61-22	298	0.45-20.0		Same as above. [Author's design.: Sample 89].	Mechanically polished and electropolished; hard coat anodizing (1/3 standard time).
▲	61-22	298	0.4-20.0		Aluminum alloy 7075. [Author's design.: Sample 129].	Mill finished and electropolished, hard coat anodized; sealed; in 10^{-5} mm Hg vacuum.
▼	61-22	298	0.45-20.0		Aluminum alloy 7075. [Author's design.: Sample 85].	Mechanically polished hard coat anodized; in 10^{-5} mm Hg vacuum.
◆	61-22	298	0.4-20.0		Aluminum alloy 7075. [Author's design.: Sample 11].	Treated same as above except shorter anodizing (1/3 standard) and sealed.
◀	61-22	298	0.45-21.0		Aluminum alloy 7075. [Author's design.: Sample 63].	Mechanically and electropolished; sulfuric acid anodized; sealed; in 10^{-5} mm Hg vacuum.
▶	61-22	422	0.45-10.0		Same as above.	Same as above.
●	61-22	589	0.4-13.0		Same as above.	Same as above.
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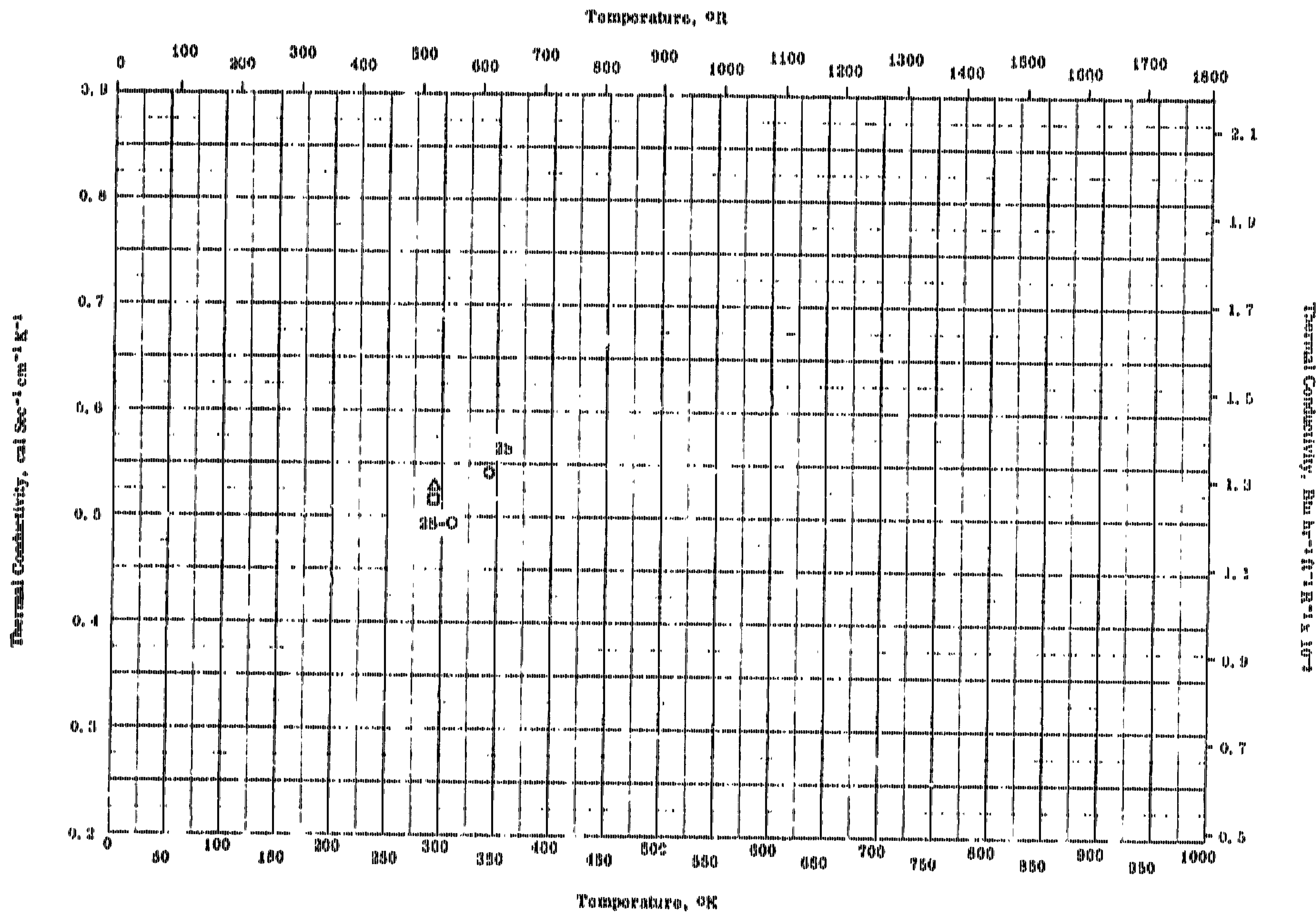
NORMAL SPECTRAL REFLECTANCE -- ALUMINUM + ZINC + ΣX_i (continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
⊖	61-22	714	0.4-20.0		Same as above.	Same as above.
◘	61-22	298	0.4-20.0		Same as above.	Same as above after previous high temperature runs.
■	61-22	298	0.45-21.0		Aluminum alloy 7075. [Author's design.; Sample 64].	Mechanically and electropolished; sulfuric acid anodized; 1.4×10^{-4} cm thick coating; sealed; in 10^{-8} mm Hg vacuum.
⊕	61-22	298	0.4-19.0		Aluminum alloy 7075. [Author's design.; Sample 65].	Same as above except no post treatment (not sealed).
▲	61-22	298	0.4-19.0		Aluminum alloy 7075. [Author's design.; Sample 66].	Same as above except shorter anodizing time (1/4 standard).
▼	61-22	298	0.4-22.0		Aluminum alloy 7075. [Author's design.; Sample 73].	Same as above and sealed.
⊞	61-22	298	0.45-20.0		Aluminum alloy 7075. [Author's design.; Sample 74].	Mechanically polished; sulfuric acid anodized 1/3 standard time; sealed; measured in 10^{-5} mm Hg vacuum.

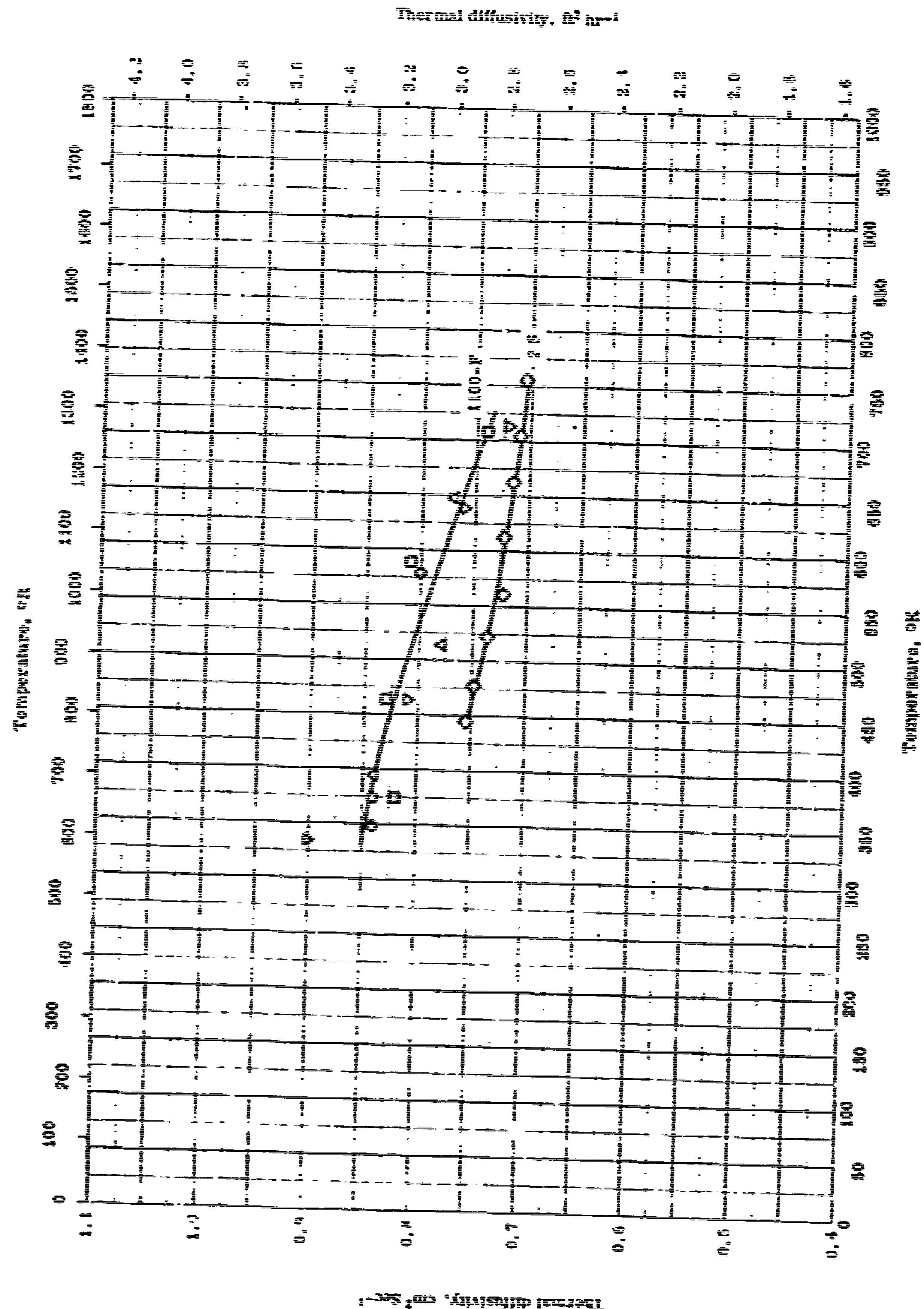


THERMAL CONDUCTIVITY -- ALUMINUM + ΣXᵢ

THERMAL CONDUCTIVITY -- ALUMINUM + EX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-4	343		3S; 1.0 Si + Fe, 0.2 Cu, 0.10 Zn, 0.08 Mn, and impurity 0.05 each and 0.15 total; nominal composition from Metal's Handbook; density 169.5 lb ft^{-3}.	Tested in vacuum.
△	49-1	298	±5	2S-H.	Hardest.
□	49-1	298	±5	2S-O; 99 min. Al nominal.	Dead soft; annealed.

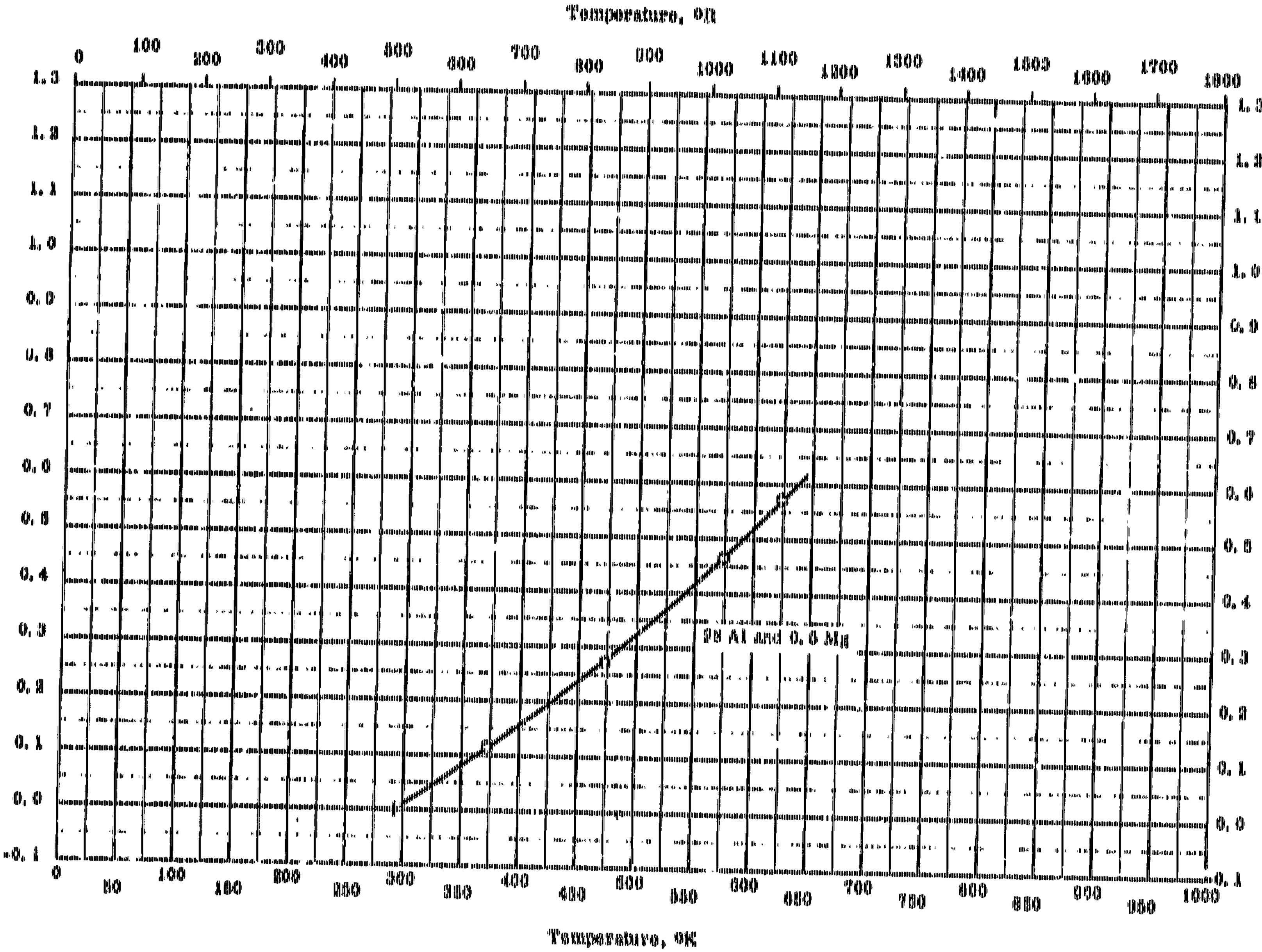


THERMAL DIFFUSIVITY -- ALUMINUM + SK_1

THERMAL DIFFUSIVITY — ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-1	348-678		1100 - F: 1.0 max (Fe + Si), 0.2 max Cu, 0.1 max Zn, 0.05 Mn, and 0.05 each and 0.15 max in total others; composition from Metal's Handbook.	Measured after fourth exposures to radiation and followed by cooling.
□	57-1	373-708		Same as above.	The above sample again exposed to radiation and followed by cooling.
△	57-1	393-648		Same as above.	The above sample again exposed to radiation and followed by cooling.
▽	57-1	330-713		Same as above.	Seventh exposure of the above sample to radiation and followed by cooling.
◇	50-3	444-700		2 S: 1.0 max (Fe + Si) and 0.2 max Cu.	



THERMAL LINEAR EXPANSION -- BERYLLIUM + ALUMINUM + ΣX_i

THERMAL LINEAR EXPANSION — BERYLLIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	52-19	203-623		71.3 Be, 27.9 Al, 0.5 Mg, 0.25 Fe, and 0.04 > Si.	Cast in iron mold.

PROPERTIES OF BERYLLIUM + MAGNESIUM + ΣX_i

REPORTED VALUES

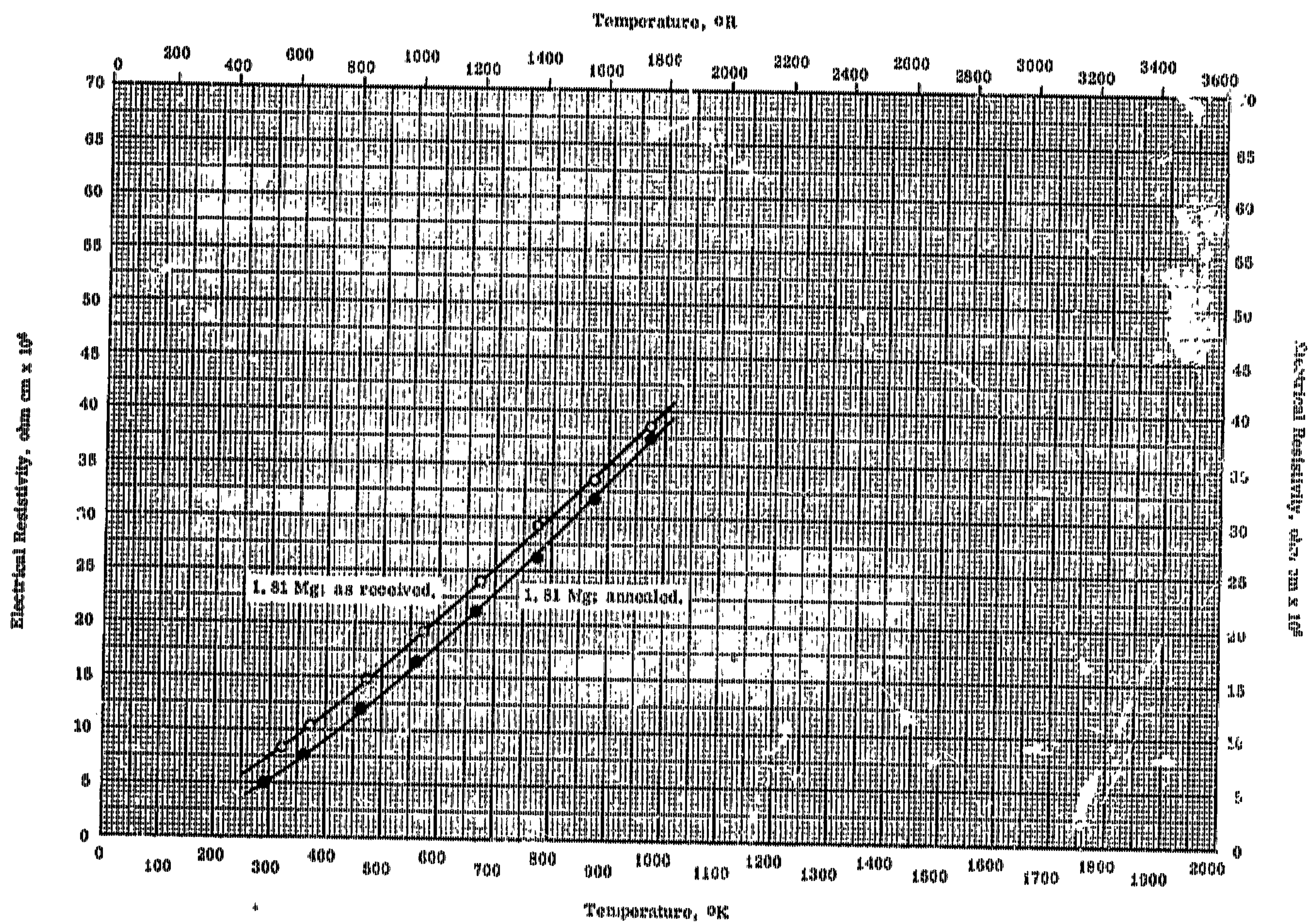
Density:

		g cm^{-3}	lb ft^{-3}
□	1.81 Mg, 1.52 F, and 0.55 Fe	1.841	114.9
△	Same as above	1.839	114.8

PROPERTIES OF BERYLLIUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	53-5	298		96.5 Be, 1.81 Mg, 1.52 F, 0.55 Fe, 0.06 Al, 0.035 Ca, 0.032 C, 0.008 Cu, and 0.005 Mn.	As received; density data.
△	53-5	298		Same as above.	Same as above.

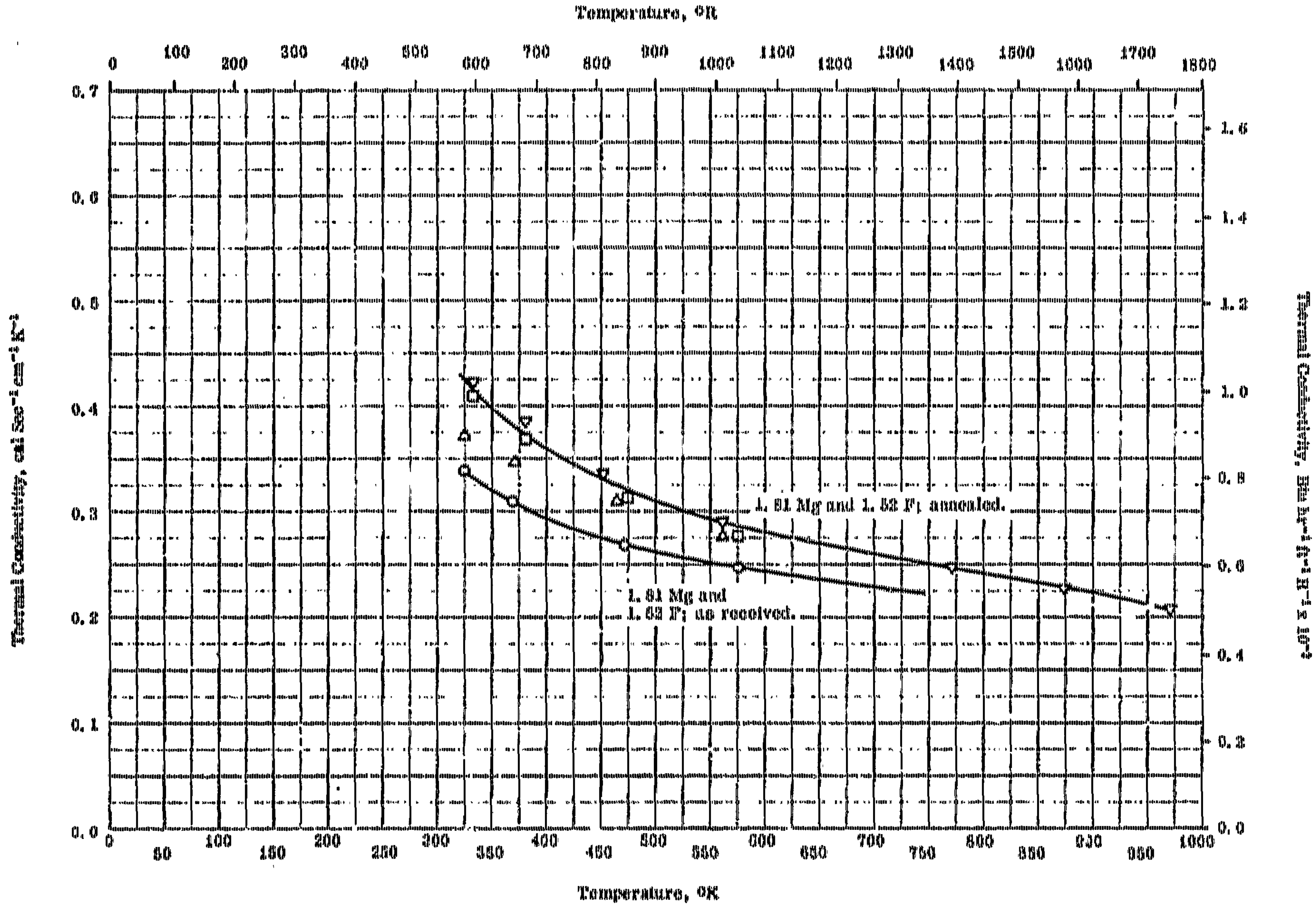


ELECTRICAL RESISTIVITY — BERYLLIUM + MAGNESIUM + ΣX_i

ELECTRICAL RESISTIVITY -- BERYLLIUM + MAGNESIUM + EX_1

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-6	293-973		96.0 Be, 1.81 Mg, 1.52 F, 0.09 Fe, 0.09 Al, 0.035 Ca, 0.032 C, 0.008 Cu, and 0.005 Mn; density 113.9 lb ft^{-3}.	As received; chill-cast.
●	53-6	293-973		Same as above.	The above specimen heat treated to about 700 C after being machined from a chill-cast bar.



THERMAL CONDUCTIVITY -- BERYLLIUM + MAGNESIUM + ΣXi

THERMAL CONDUCTIVITY -- BERYLLIUM + MAGNESIUM + ΣX$_i$

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-5	323-573		96.5 Be, 1.91 Mg, 1.33 F, 0.55 Fe, 0.06 Al, 0.038 Ca, 0.032 C, 0.008 Cu, 0.005 Mn; density 114.9 lb ft^{-3}.	As received.
□	53-5	323-573		Same as above.	Same as above except heat-treated at 700 C.
△	53-5	323-573		Same as above; density 114.8 lb ft^{-3}.	As received.
▽	53-6	323-973		Same as above.	Same as above except heat-treated at 700 C.

PROPERTIES OF BERYLLIUM + ΣX_i

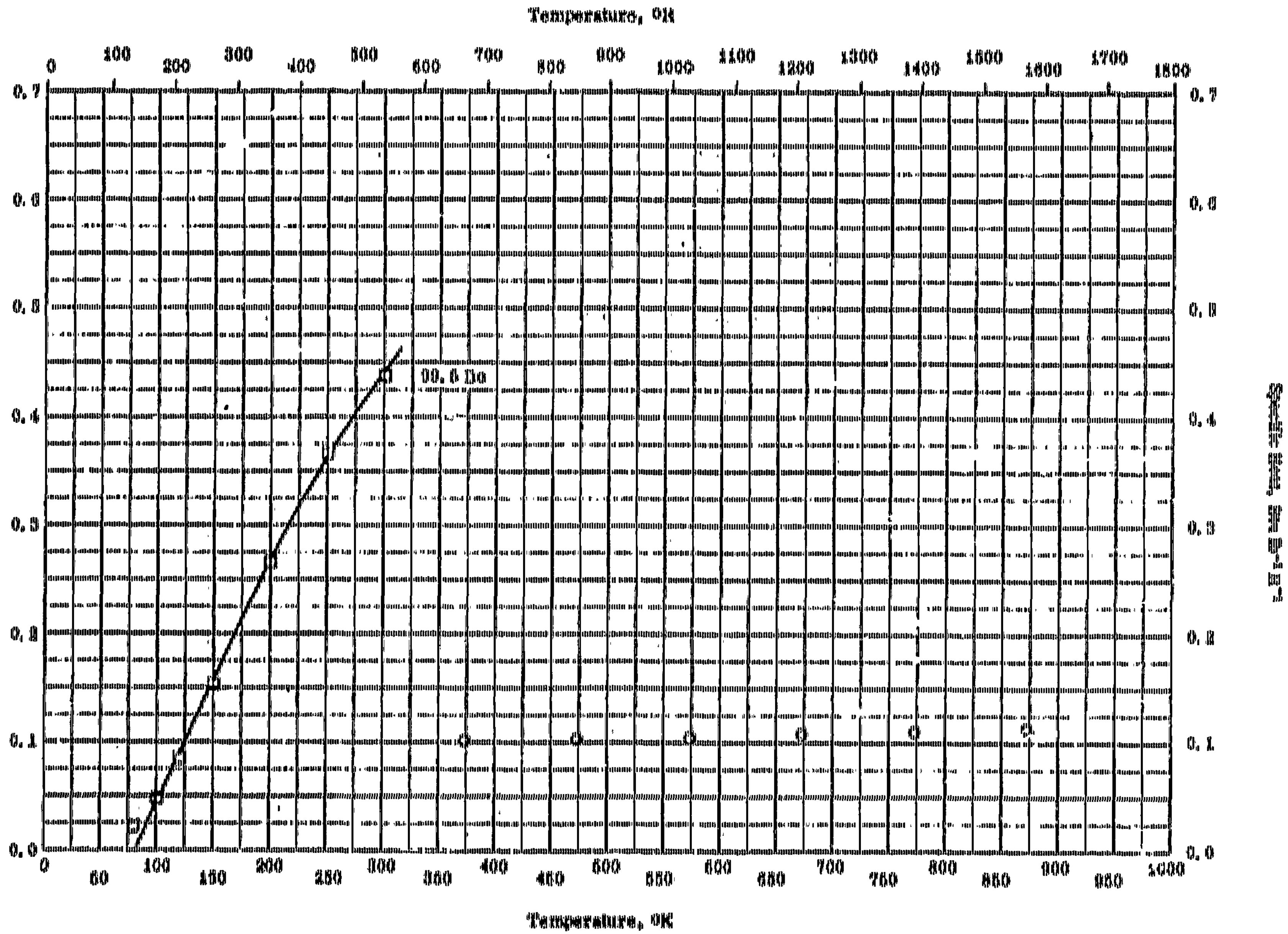
REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
▽ 99.[illegible] Be	1.8[illegible]	112.8

PROPERTIES OF BERYLLIUM + EX_1

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▽	83-5	298		German flake from Am. G. E. Co.; 98.9 pure, 0.018 Be insoluble in HCl, 0.18 Fe, 0.13 Al, 0.08 Cl, 0.03 Cu, and remainder was insoluble matter which consisted of BeO containing about 3 Al_2O_3;	

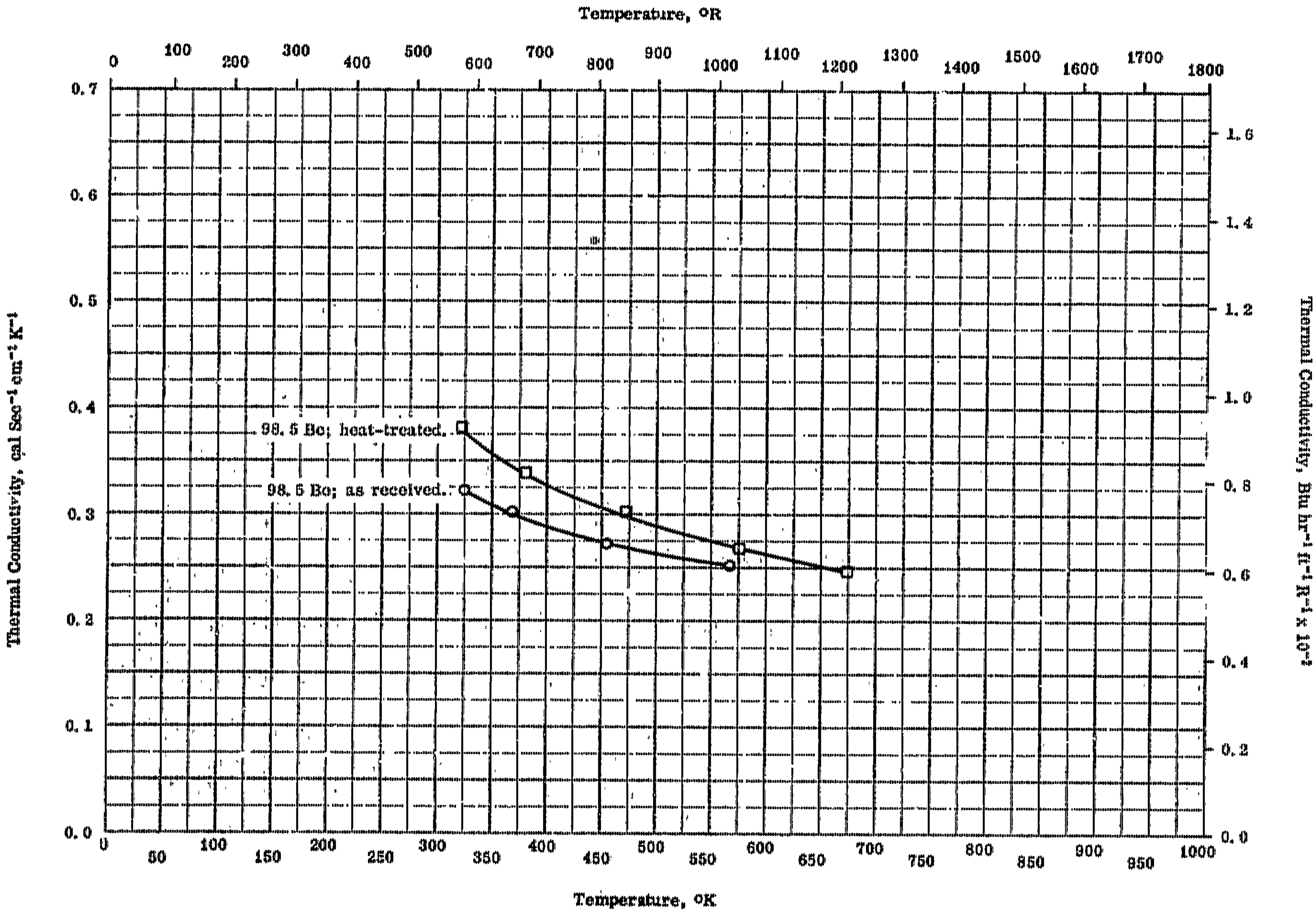


SPECIFIC HEAT -- BERYLLIUM + ZN

SPECIFIC HEAT -- BERYLLIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-12	373-873	≤2.7	Beryllium alloy.	
□	53-15	5-300		99.5 Be, 0.15 Cl_2, and 0.10 O_2.	

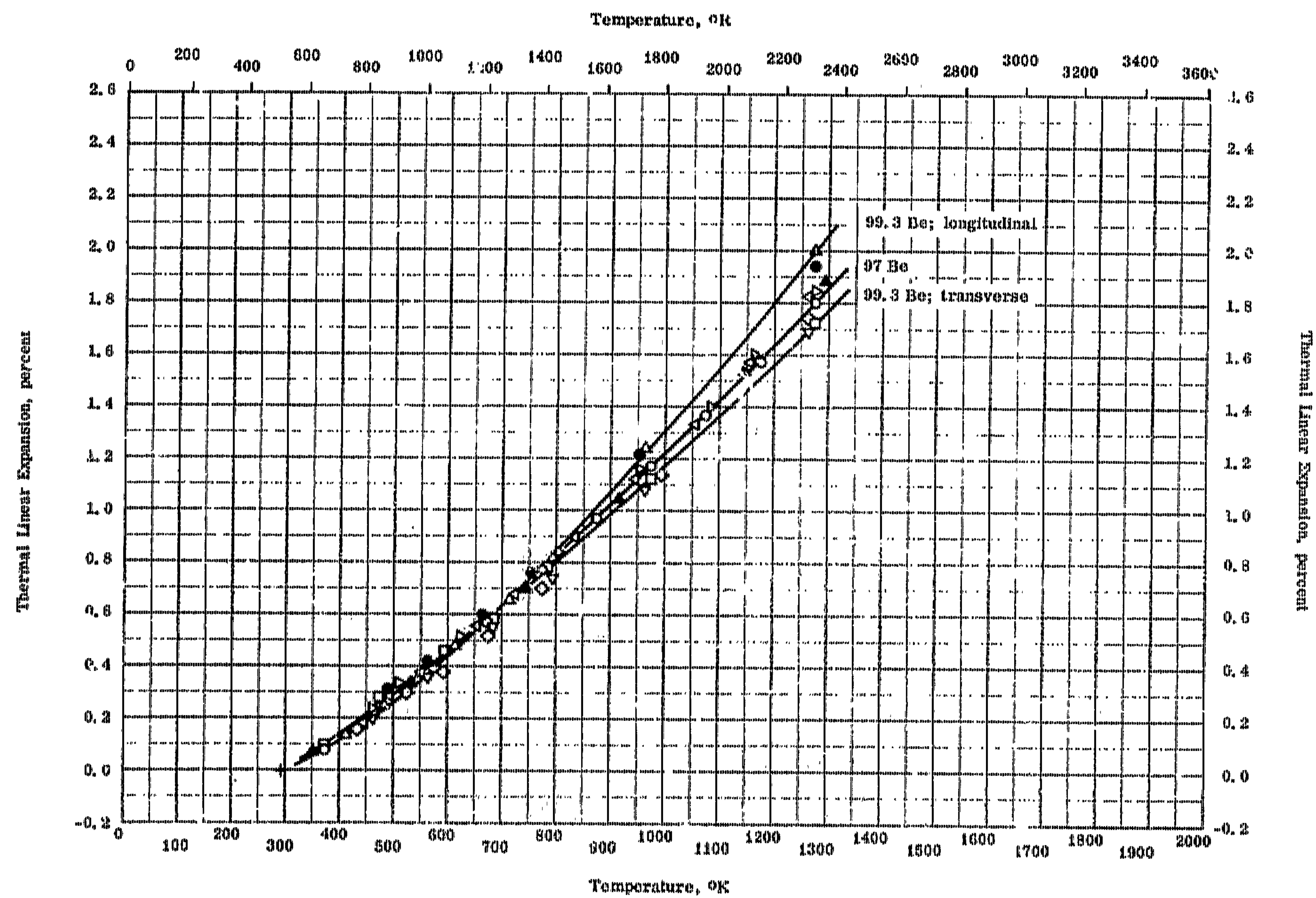


THERMAL CONDUCTIVITY -- BERYLLIUM + ΣX_i

THERMAL CONDUCTIVITY — BERYLLIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-5	323-673		German Flake; 98.6 Be, 0.18 Be insoluble in H Cl, 0.18 Fe, 0.13 Al, 0.03 Cu.	As received.
□	53-5	323-673		Same as above.	Same as above except heat-treated to about 700 C.



THERMAL LINEAR EXPANSION -- BERYLLIUM + ΣX$_i$

THERMAL LINEAR EXPANSION — BERYLLIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	50-17	373-1273		99.28 pure, 0.179 O, 0.170 Fe, 0.140 Al, 0.086 Si, 0.080 C, 0.020 Cu, Mn each, 0.007 Ni, Ca each.	Transverse; extruded, then vac annealed 1 hr at 800 C; measured in argon atm.
△	50-17	373-1273		Same as above.	Longitudinal; extruded, then vac annealed 1 hr at 800 C; measured in argon atm.
◇	50-17	373-1273		Same as above.	Transverse; extruded (Run No. 1); measured in argon atm.
▽	50-17	373-1273		Same as above.	Same as above (Run No. 2).
▷	50-17	373-1273		Same as above.	Longitudinal; extruded (Run No. 1); measured in argon atm.
◁	50-17	373-1273		Same as above.	Same as above (Run No. 2).
●	50-17	373-1273		Same as above.	Same as above (Run No. 3).
▲	50-17	373-1273		Same as above.	Same as above; from author's mean coefficient.
○	49-13	323-1273		97 Be, 0.58 Mg, 0.28 Al, 0.141 Si, 0.094 Fe, 0.07 Ca, 0.06 C, 0.04 Mn, 0.01 Ni, < 0.01 Cu, about 2.0 O_2 by difference.	Average value of those parallel and perpendicular to hex. axis.

PROPERTIES OF BORON + ΣX_i

REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
O 99.4 and 99.5 pure	2.35 ± 0.01	146.7 ± 0.6

PROPERTIES OF BORON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	57-36	298		Two samples of 99.4 and 99.6 purities.	

PROPERTIES OF CERIUM + SILICON + ΣX_i

REPORTED VALUES

Melting Point:	K	R
O 0.4 > Si and 0.22 > Fe	1088	1959

PROPERTIES OF CERIUM + SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	48-4	1088		99.56 + pure 0.40 > Si, 0.22 > Fe, 0.15 > Ca, 0.08 > Al and traces of Mg, C, Pr.	

PROPERTIES OF CERIUM + ΣX_i

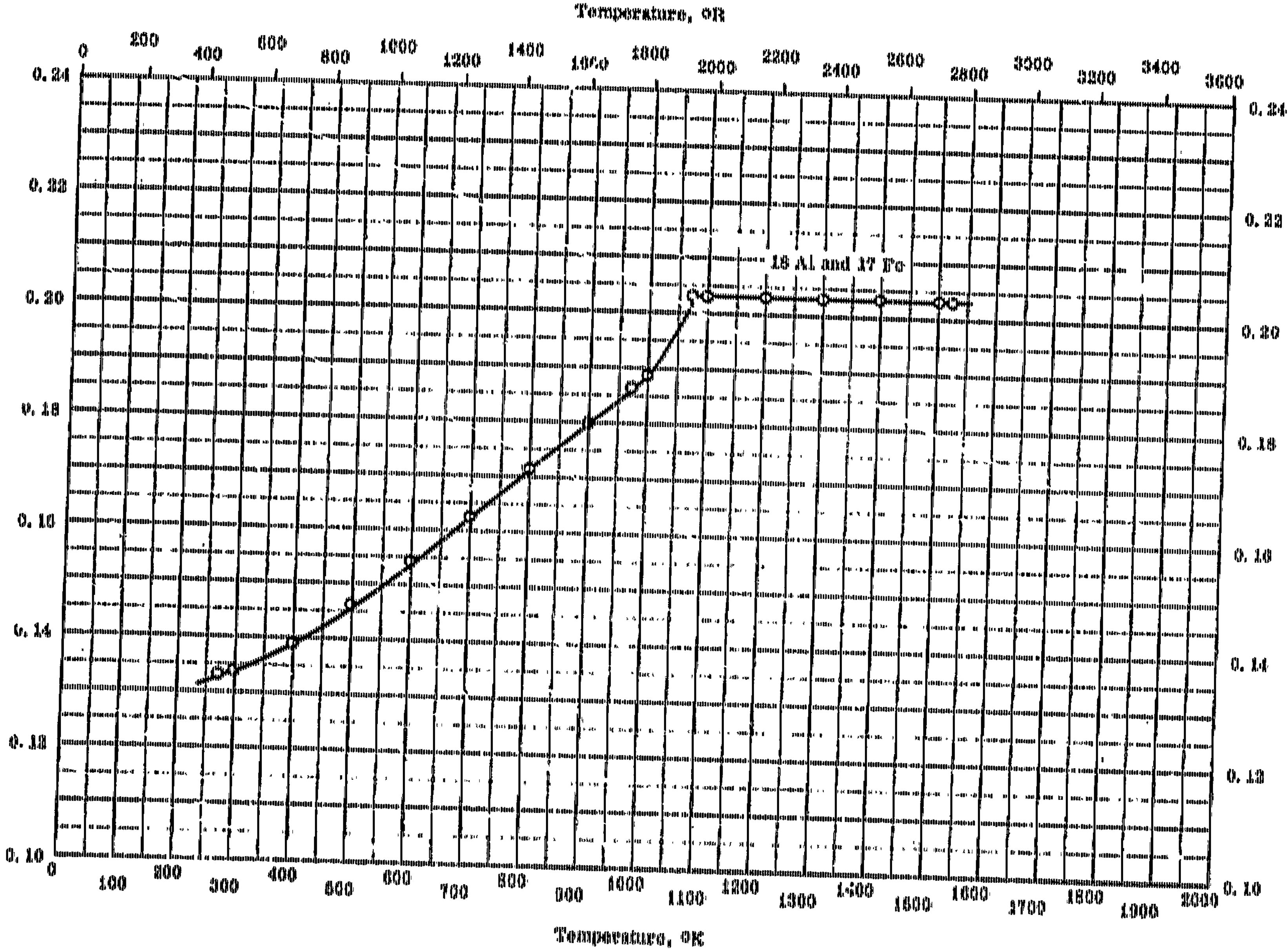
REPORTED VALUES

Melting Point	K	R
○ 98.5 Ce	1040 ± 3	1872 ± 5
□ 98–99 Ce	1050	1891
△ 99.3 Ce	1058 ± 5	1905 ± 9

PROPERTIES OF CERIUM + EX_1

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-27	1043		98.9 pure, 1 other rare earths, 0.1 C, residue undetermined.	
□	43-3	1051		98-99 Ce, 0.14 each Fe and Mg, and 0.03 Si.	
△	55-27	1058		99.3 Ce, 0.18 alkaline earth metals, 0.13 C, and 0.4 > other rare earth.	



SPECIFIC HEAT — CHROMIUM + ALUMINUM + ΣX_i

SPECIFIC HEAT -- CHROMIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	60-13	273-1523	0.4	63.91 Cr, 18.11 Al, 16.55 Fe, 0.67 Si, 0.024 C, and 0.006 S.	

PROPERTIES OF CHROMIUM + IRON + ΣX_i

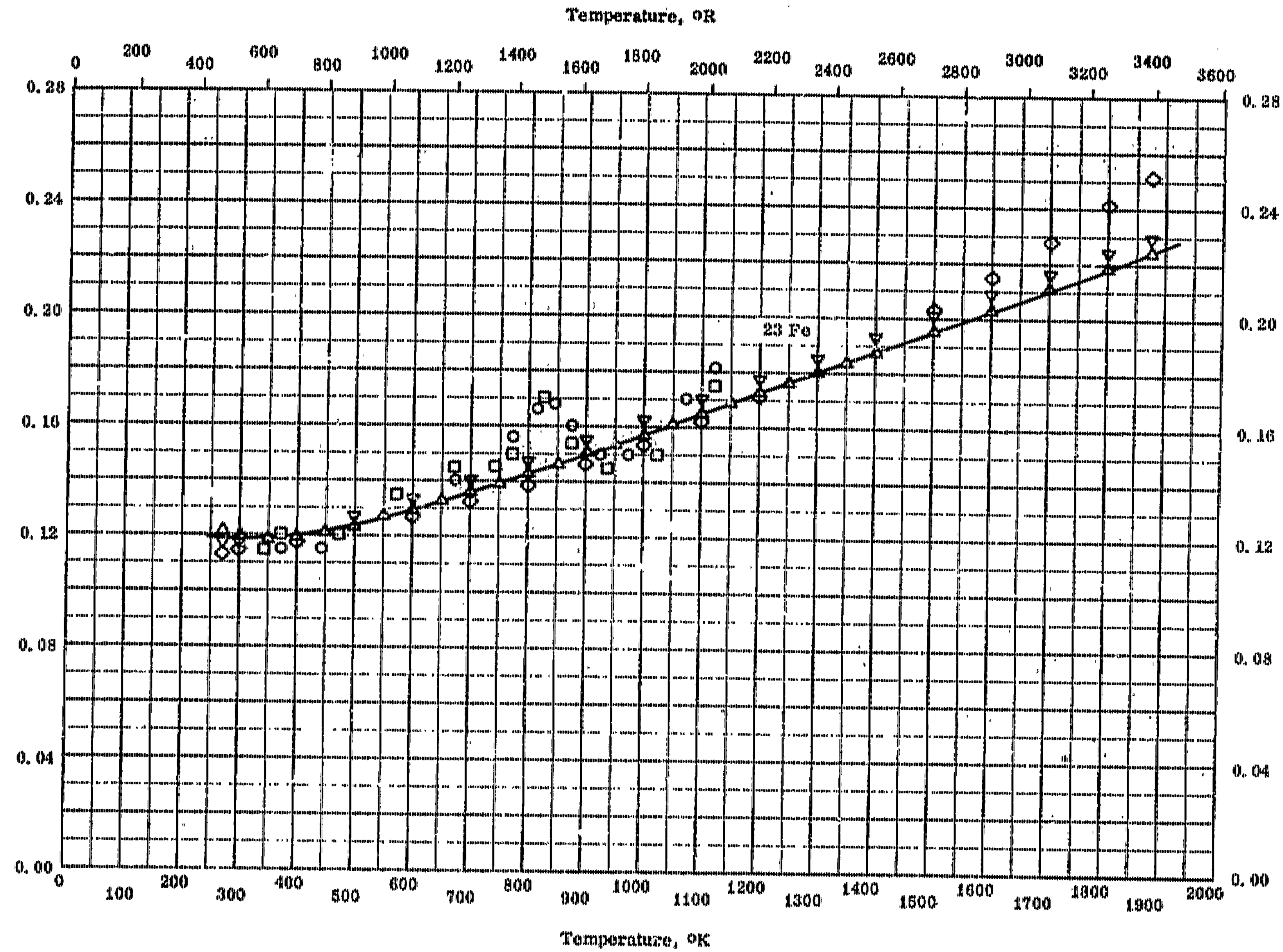
REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
▷ 22 Fe and 22 W	8.4290	526.21
○ 23 Fe and 20 Mo	7.7476	483.67
▲ 20 Fe and 20 W	8.2688	516.21
□ 25 Fe and 15 Mo	7.63	476
△ 0.7 Fe and 0.34 Si	7.136	445.5

PROPERTIES OF CHROMIUM + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▷	46-2	298		54 Cr, 22 Fe, 22 W, 2 Mo, and 0.021 C.	As cast.
○	46-2	298		57 Cr, 23 Fe, 20 Mo, and 0.018 C.	As cast.
▲	46-2	298		58 Cr, 20 Fe, 20 W, 2 Mo, and 0.018 C.	As cast.
□	46-2	298		60 Cr, 25 Fe, and 15 Mo.	As cast.
△	41-4	298		98.3 Cr, 0.7 Fe, 0.34 Si, 0.08 C, 0.06 Mn, and 0.014 N.	Hot-swaged.

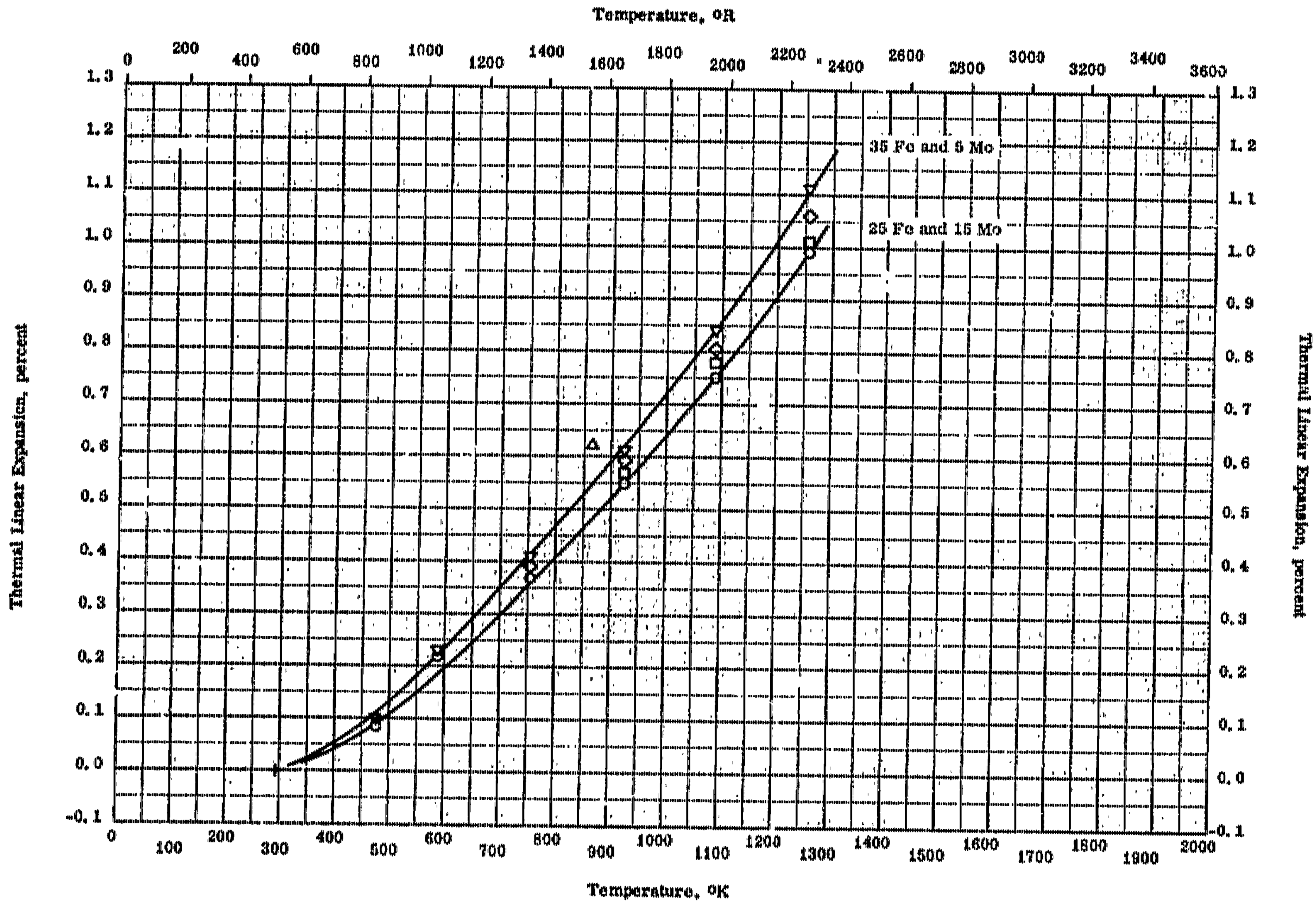


SPECIFIC HEAT — CHROMIUM + IRON + ΣX_i

SPECIFIC HEAT — CHROMIUM + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-13	343-1123		55.57 Cr; 43.285 Fe, 0.95 Si, 0.12 Al, 0.041 N_2, and 0.034 C.	Heated for 3 hrs at 1000 C in vacuum electric furnace, furnace cooled to 800 C, and then cooled to room temperature at 30 C hr^{-1}.
□	53-13	343-1123		53.07 Cr, 45.742 Fe, 0.93 Si, 0.14 Al, 0.077 Ni, and 0.041 C.	Same as above.
△	60-13	373-1873	1.5	Carbonless ferrochromium alloy; 76.45 Cr, 22.792 Fe, 0.35 Si, 0.26 C, 0.14 Al, and 0.008 S.	
▽	60-13	273-1873	1.0	Nitrated ferrochromium; 77.75 Cr, 19.787 Fe, 1.20 N_2, 0.70 Al, 0.52 Si, 0.028 C, and 0.014 S.	
◇	60-13	273-1873	0.8-1.2	Aluminothermic chromium; 98.66 Cr, 0.64 Fe, 0.43 Al, 0.20 Si, 0.036 C, 0.007 P.	



THERMAL LINEAR EXPANSION -- CHROMIUM + IRON + ΣX_i

THERMAL LINEAR EXPANSION — CHROMIUM + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	46-2	297-1256		60 Cr, 25 Fe, and 15 Mo.	As cast.
□	46-2	297-1256		Same as above.	Aged 200 hrs at 1600 F.
△	46-2	297-867		60 Cr, 30 Fe, and 10 Mo.	
◇	46-2	297-1256		60 Cr, 35 Fe, and 5 Mo.	As cast.
▽	46-2	297-1256		Same as above.	Aged 200 hrs at 1600 F.

PROPERTIES OF CHROMIUM + MOLYBDENUM + ΣX_i

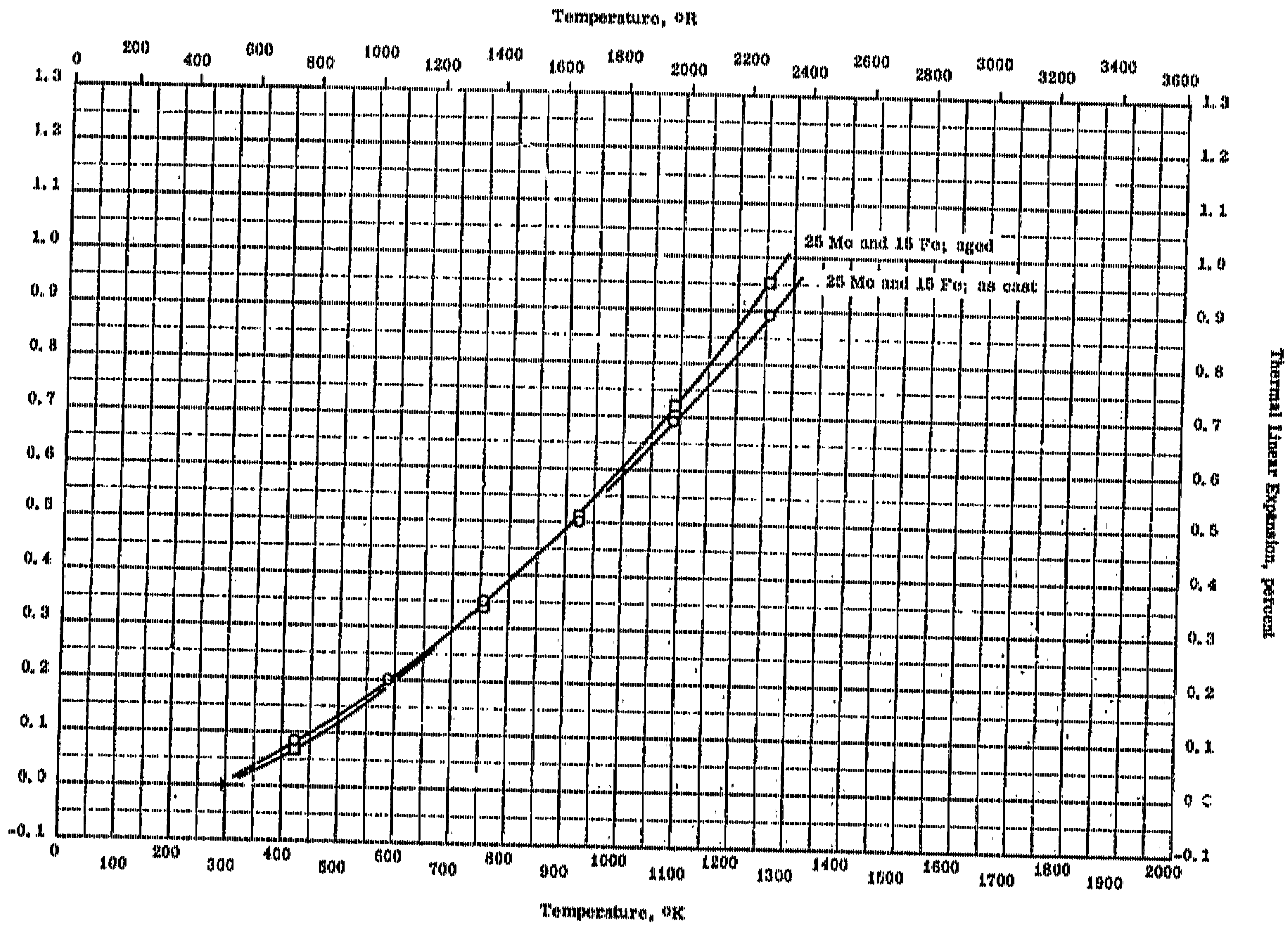
REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
O 25 Mo and 15 Fe	7.87	4.91

PROPERTIES OF CHROMIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	46-2	398		60 Cr, 25 Mo, and 15 Fe.	As Cast.



THERMAL LINEAR EXPANSION — CHROMIUM + MOLYBDENUM + ΣX_i

THERMAL LINEAR EXPANSION — CHROMIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	46-2	297-1256		60 Cr, 25 Mo, and 15 Fe.	As cast.
□	46-2	297-1256		Same as above.	Aged 200 hrs at 1600 F.

PROPERTIES OF CHROMIUM + NICKEL + ΣX_i

REPORTED VALUES

Melting Point:	K.	R
O 40 Ni and 12 Mo	1233	2222

PROPERTIES OF CHROMIUM + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-28	1568	±3	48 Cr, 40 Ni, and 12 Mo; nominal composition.	M.P. by visual observation.

PROPERTIES OF CHROMIUM + SILICON + ΣX_i

REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
○ 1.0 Si and 0.9 Fe	6.974	435.4

PROPERTIES OF CHROMIUM + SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	41-4	298		96.3 Cr, 1.0 Si, 0.9 Fe, 0.53 C, 0.07 Mn, and 0.03 N.	Cast.

PROPERTIES OF CHROMIUM + TUNGSTEN + ΣX_i

REPORTED VALUES

Density:		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	29 W and 23 Fe	8.9251	557.18
△	29 W and 23 Fe	8.9252*	557.19*
▽	27 W and 23 Fe	8.7831	548.31
◁	24 W and 22 Fe	8.6244	538.41
▷	22 W and 22 Fe	8.4290	526.21
◇	22 W and 20 Fe	8.4164	525.42
●	22 W and 21 Fe	8.4541*	527.78*
□	22 W and 21 Fe	8.5670	534.82
▲	20 W and 20 Fe	8.2666	516.21
▼	20 W and 19 Fe	8.3100	518.78

*Most probable value for alloys of this composition.

PROPERTIES OF CHROMIUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	46-2	298		45 Cr, 29 W, 23 Fe, 3 Mo, and 0.05 C.	As cast.
△	46-2	298		45 Cr, 29 W, 23 Fe, 3 Mo, and 0.029 C.	As cast.
▽	46-2	298		47 Cr, 27 W, 23 Fe, 3 Mo, and 0.026 C.	As cast.
◁	46-2	298		52 Cr, 24 W, 22 Fe, 2 Mo, and 0.018 C.	As cast.
▷	46-2	298		54 Cr, 22 W, 22 Fe, 2 Mo, and 0.021 C.	As cast.
◇	46-2	298		56 Cr, 22 W, 20 Fe, 2 Mo, and 0.018 C.	As cast.
●	46-2	298		57 Cr, 22 W, 21 Fe, and 0.021 C.	As cast.
□	46-2	298		57 Cr, 22 W, 21 Fe, and 0.021 C.	Cast and held at 2060 R for 324 hrs.
▲	46-2	298		58 Cr, 20 W, 20 Fe, 2 Mo, and 0.018 C.	As cast.
▼	46-3	298		59 Cr, 20 W, 19 Fe, 2 Mo, and 0.016 C.	As cast.

PROPERTIES OF CHROMIUM + ΣX_i

REPORTED VALUES

	g cm^{-3}	lb ft^{-3}
Density:		
▽ 0.43 O_2 as Cr_2O_3 and hydrated oxide	6.975*	435.4*
△ Same as above	7.08	442
○ Same as above	7.15	446

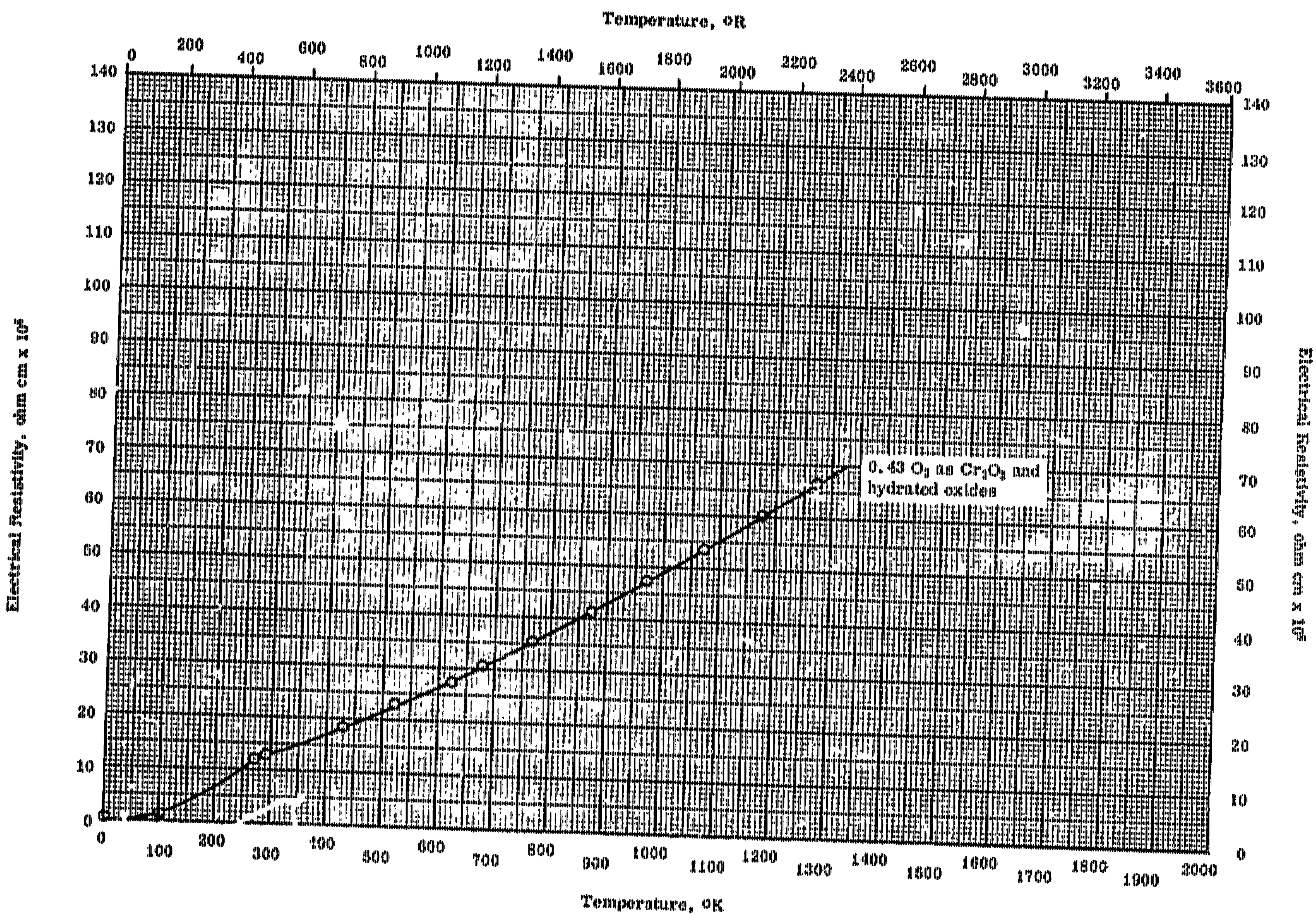
	cal g^{-1}	Btu lb^{-1}
Heat of Sublimation:		
◇ 0.3 O_2	1802 ± 3	3243 ± 6

* Most probable value for alloys of this composition.

PROPERTIES OF CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◇	50-11	0		99.7 Cr and 0.3 O_2.	Δh_s from vapor pressure data.
▽	57-19	298		Electro-deposited; 0.43 O_2 as Cr_2O_3 and hydrated oxide.	Initial condition
△	57-19	298		Same as above.	Δh_s of the above sample measured after heat treatment at 405 C.
○	57-19	298		Same as above.	Δh_s of the above sample measured after heat treated to 1410 C.

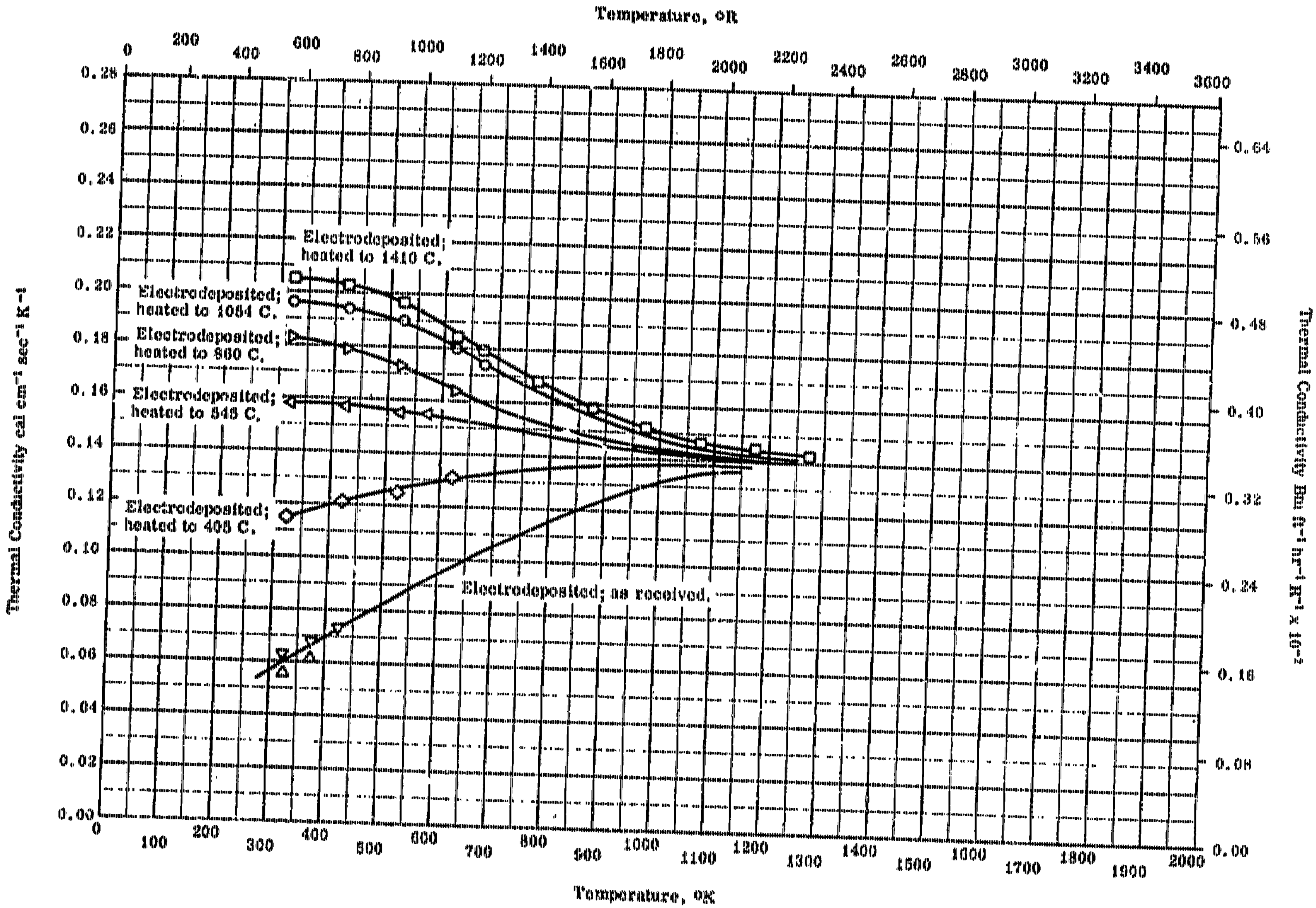


ELECTRICAL RESISTIVITY -- CHROMIUM + ΣX_i

ELECTRICAL RESISTIVITY -- CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-10	5-1273		0.43 O_2 mostly present as Cr_2O_3 and hydrated oxides.	Preheated to 1410 C and cooled; data not shown for lower preheated temperatures given by author.



THERMAL CONDUCTIVITY -- CHROMIUM + ΣX_i

THERMAL CONDUCTIVITY — CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	57-2	323-1373		0.43 O_2 as Cr_2O_3 and hydrated oxides.	Electrodeposited.
▽	57-2	323-673		Same as above.	After heating to 213 C.
◇	57-2	323-623		Same as above.	After heating to 405 C.
◁	57-2	323-573		Same as above.	After heating to 545 C.
▷	57-2	323-623		Same as above.	After heating to 860 C.
○	57-2	323-684		Same as above.	After heating to 1054 C.
□	57-2	323-1207		Same as above.	After heating to 1410 C.

PROPERTIES OF COBALT + CHROMIUM + ΣX$_i$

REPORTED VALUES

Density**		g cm^{-3}	lb ft^{-3}
□	Stellite No. 21	8.30*	518*
◁	Stellite No. 21	8.19	511
△	Stellite No. 23	8.54	533
◇	Haynes alloy No. 25	9.15*	571*
▽	Stellite No. 30	8.31	519
▷	Stellite No. 31	8.61*	538*
●	Stellite No. 31	8.08	504
■	Stellite No. 31	8.60	537
▲	Haynes alloy No. 16	9.04	564
▼	30 Cr and 6 W	8.44	526
▶	Jessop G32	8.26	516

Melting Point		K	R
○	Vitallium	1688	3039
◀	30 Cr and 6 W	1693	3048

* Most probable value for alloys of this composition.

** See the following figure for additional information on densities as a function of temperature.

PROPERTIES OF COBALT + CHROMIUM + ΣX_i

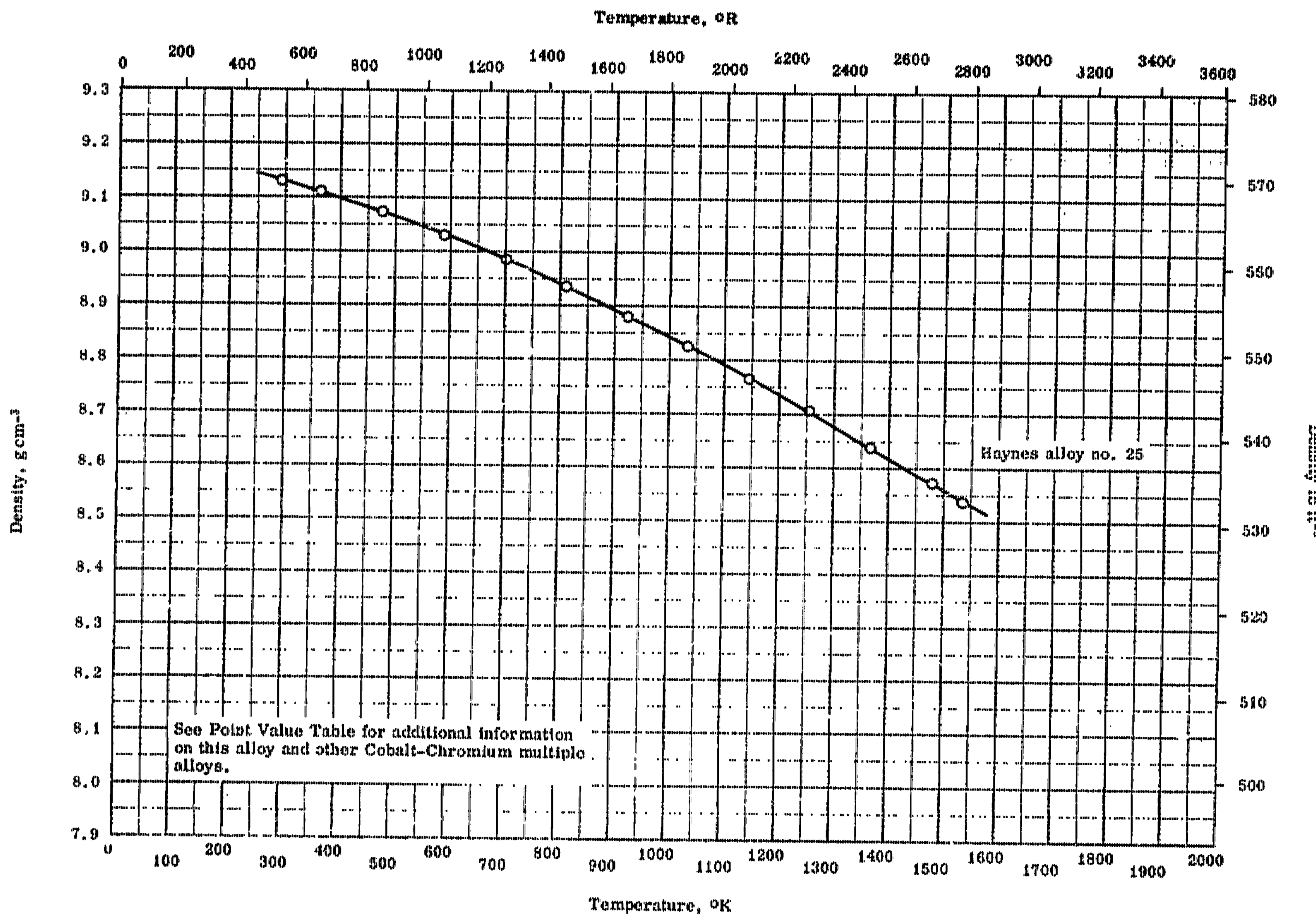
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-19	1688		Vitallium; 25-35 Cr, 4.5-6.5 Mo, 1.5-3.5 Ni, 2 > Fe, and 0.2-0.35 C.	Reacted with SiC support; in vacuum; M. P. by collapse of hole in disk.
□	50-3 also 47-2	298		Stellite No. 21 (AMS No. 5385; NDRC No. NR-10); 25-30 Cr, 4.5-6.5 Mo, 1.5-3.5 Ni, 2 > Fe, and 0.2-0.35 C.	
△	50-3 also 47-2	298		Stellite No. 23 (AMS-5375; NDRC-61); 23-29 Cr, 4-7 W, 2 > Fe, 1.5 > Ni, and 0.35-0.5 C.	
◇	50-3 also 47-2	298		Haynes Alloy No. 25 (L-605); 19-21 Cr, 14-16 W, 9-11 Ni, 1-2 Mn, 2 > Fe, 1 > Si, and 0.15 > C.	
▽	50-3 also 47-2	298		Stellite No. 30 (AMS-5380; NR-12); 23-29 Cr, 13-17 Ni, 5-7 Mo, 2 > Fe and 0.35-0.50 C.	
▷	50-3 also 47-2	298		Stellite No. 31 (AMS-5382; NR-71); 23-28 Cr, 9-12 Ni, 6-9 W, 2 > Fe, and 0.45-0.60 C.	
▲	50-3 also 47-2	298		Haynes Alloy No. 36 (L-251); 17.5-19.5 Cr, 14-15 W, 9-11 Ni, 2 > Fe 1-1.5 Mn, 0.35-0.65 Si, 0.35-0.45 C, and 0.01-0.05 B.	
◀	52-14	1693		30 Cr and 6 W; nominal composition.	Powder mixed 15 hrs, pressed at 70,000 psi, sintered 8 hrs at 1325 C in dry H_2.

(continued onto next page)

REFERENCE INFORMATION

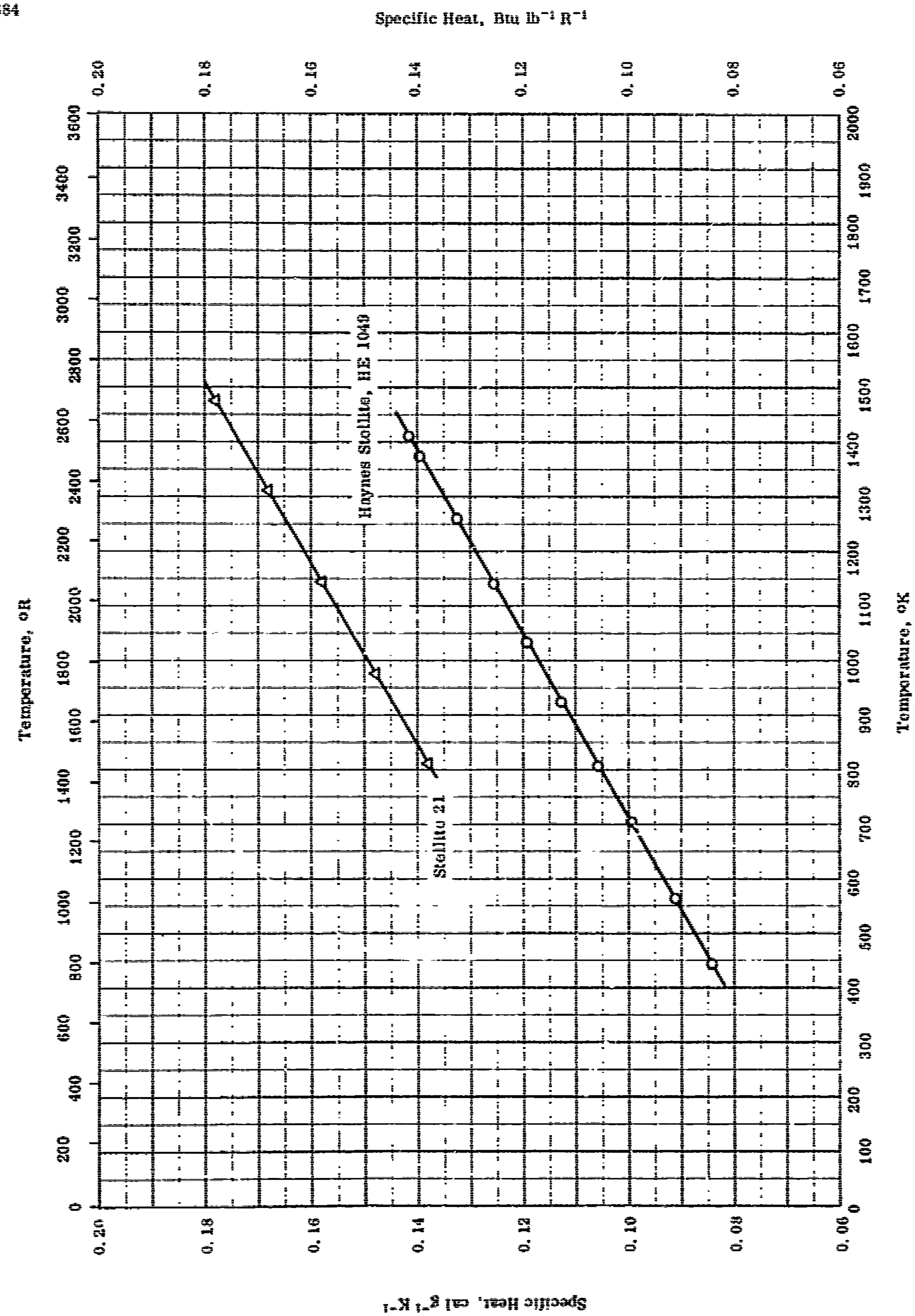
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▼	52-14	298		Same as above.	Same as above.
●	55-31	298		Haynes Stellite 31 (x-40); 23-28 Cr, 9-12 Ni, 6-9 W, 2 max. Fe, and 0.45-0.60 C.	Prepared like a cermet; compacted at 60,000 psi with camphor, and sintered 30 min at 2500 F.
■	55-31	298		Same as above.	
▶	52-2	298		Jessop G 32 (British design.); 46.6 Co, 19.1 Cr, 10.5 Ni, 3.0 V, 2.2 Mo, 1.4 Nb, 0.77 Mn, 0.52 Si, and 0.27 C.	
◁	58-2	298		Stellite No. 21; 60.49 Co, 26.69 Cr, 5.42 Mo, 2.38 Ni, 1.54 Fe, and 0.258 C.	



DENSITY — COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

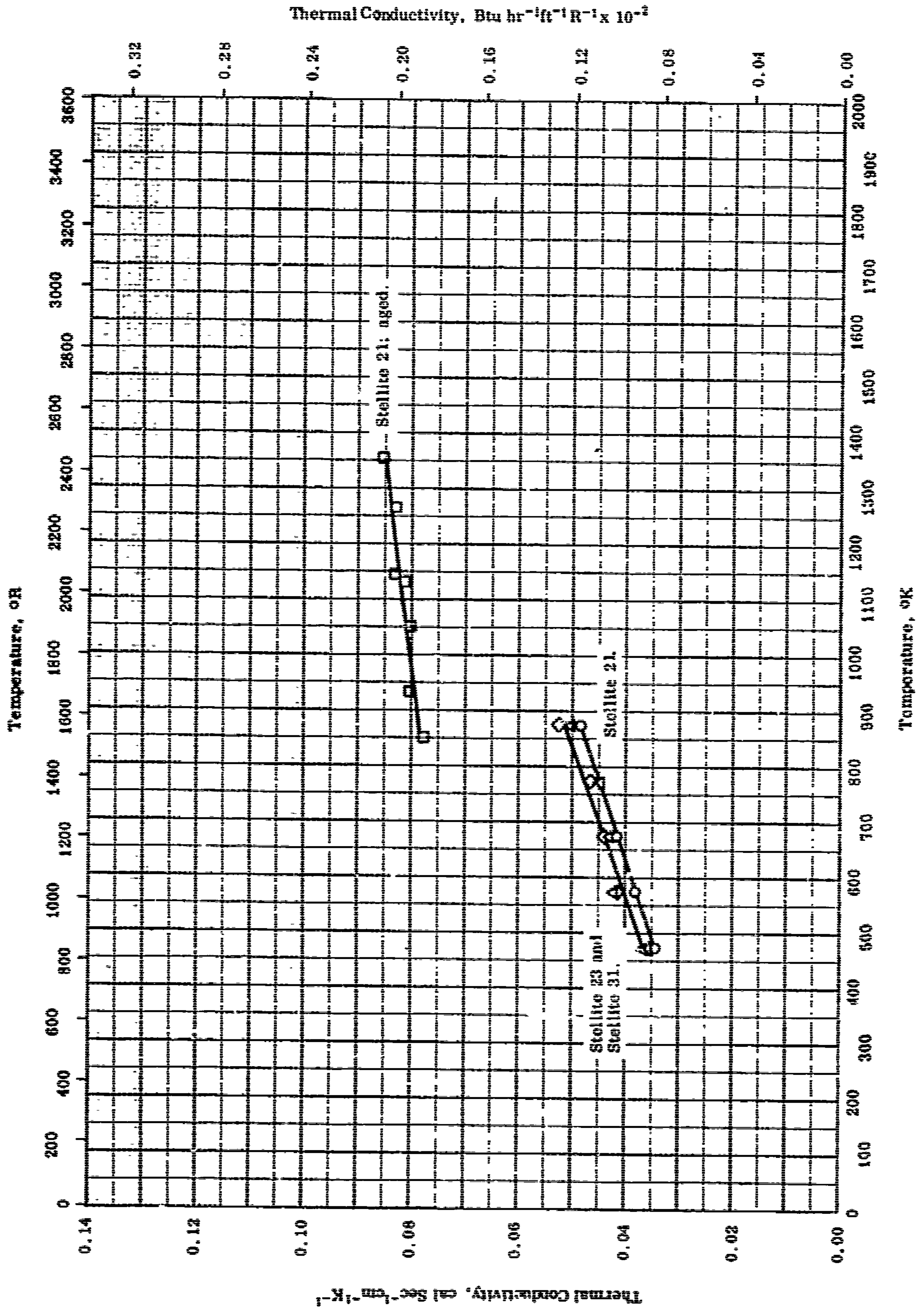
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	62-16	294-1533		Haynes alloy no. 25; 21 Cr, 16 W, 11 Ni, 3 Fe, 2 Mn, 1 Si, 0.15 C, 0.04 P, and 0.03 S.	



SPECIFIC HEAT -- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

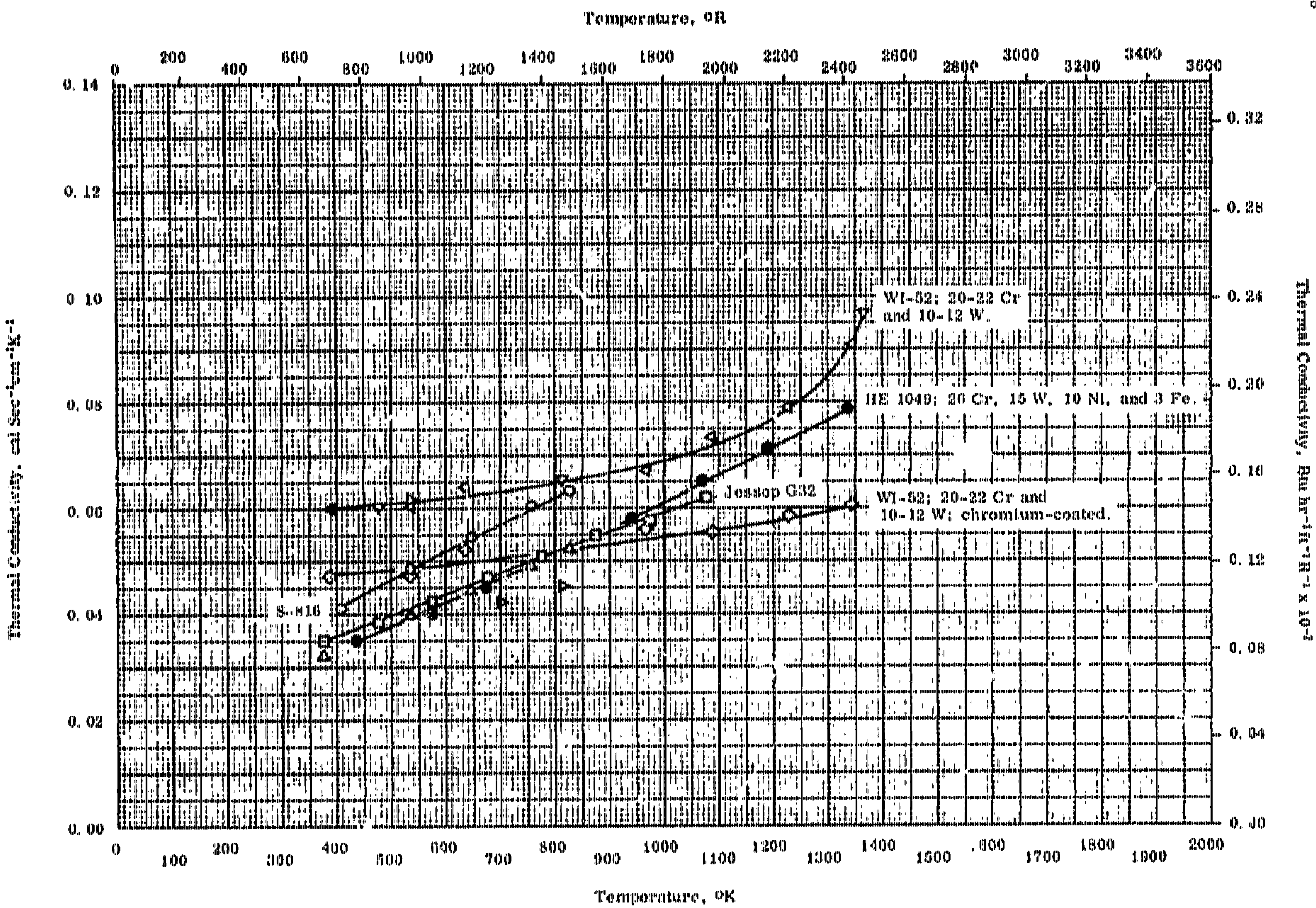
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-2	810-1440	3.0	Stellite 21; composition before test: 60.49 Co, 26.60 Cr, 5.42 Mo, 2.38 Ni, 1.54 Fe, and 0.258 C, and composition after test: 62.27 Co, 26.74 Cr, 5.42 Mo, 2.42 Ni, 1.23 Fe, and 0.246 C; density 511.2 lb ft^{-3}.	
△	61-2	444-1412	3.0	Haynes Stellite, HE 1049; 43.6 Co, 26.0 Cr, 15.0 W, 10.0 Ni, 3.0 Fe, 0.8 Mn, 0.8 Si, and 0.4 B; density 552 lb ft^{-3}.	Under helium atmosphere.



THERMAL CONDUCTIVITY — COBALT + CHROMIUM + ΣXi
(Stellites)

REFERENCE INFORMATION

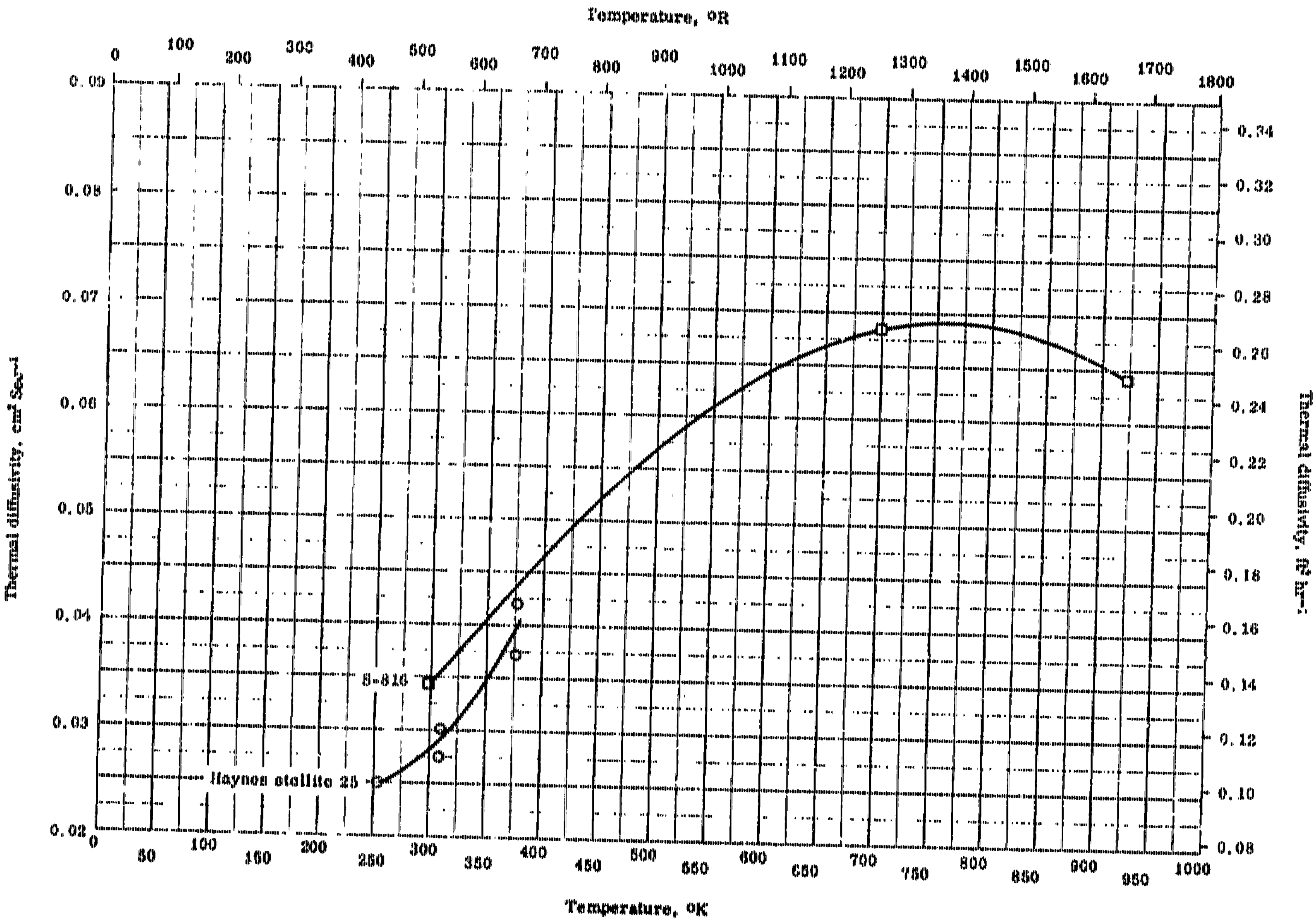
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	47-2	473-873		Stellite 21 (AMS-5385, NRDC-10); 25 - 30 Cr, 4.5 - 6.5 Mo, 1.5 - 3.5 Ni, 2.0 max Fe, 0.20 - 0.35 C; density 518 lb ft^{-3}.	
□	58-2	849-1356	5.0	Stellite 21; composition before test: 60.49 Co, 26.69 Cr, 5.42 Mo, 2.38 Ni, 1.54 Fe, 0.258 C and after test: 62.27 Co, 26.74 Cr, 5.42 Mo, 2.42 Ni, 1.23 Fe, 0.264 C; density 511 lb ft^{-3}.	Aged 15 hrs at 1400 - 2000 F before lower temp. data are taken.
△	47-2	473-873		Stellite 23 (AMS-5375, NRDC-61); 23.0 - 29.0 Cr, 4.0 - 7.0 W, 2.0 > Fe, 1.50 > Ni, 0.35 - 0.50 C; density 533 lb ft^{-3}.	
◇	47-2	473-873		Stellite 31 (AMS-5382, NRDC-71); 23 - 28.0 Cr, 9.0 - 12.0 Ni, 6.0 - 9.0 W, Fe < 2.0, 0.45 - 0.60 C; density 538 lb ft^{-3}.	



THERMAL CONDUCTIVITY -- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

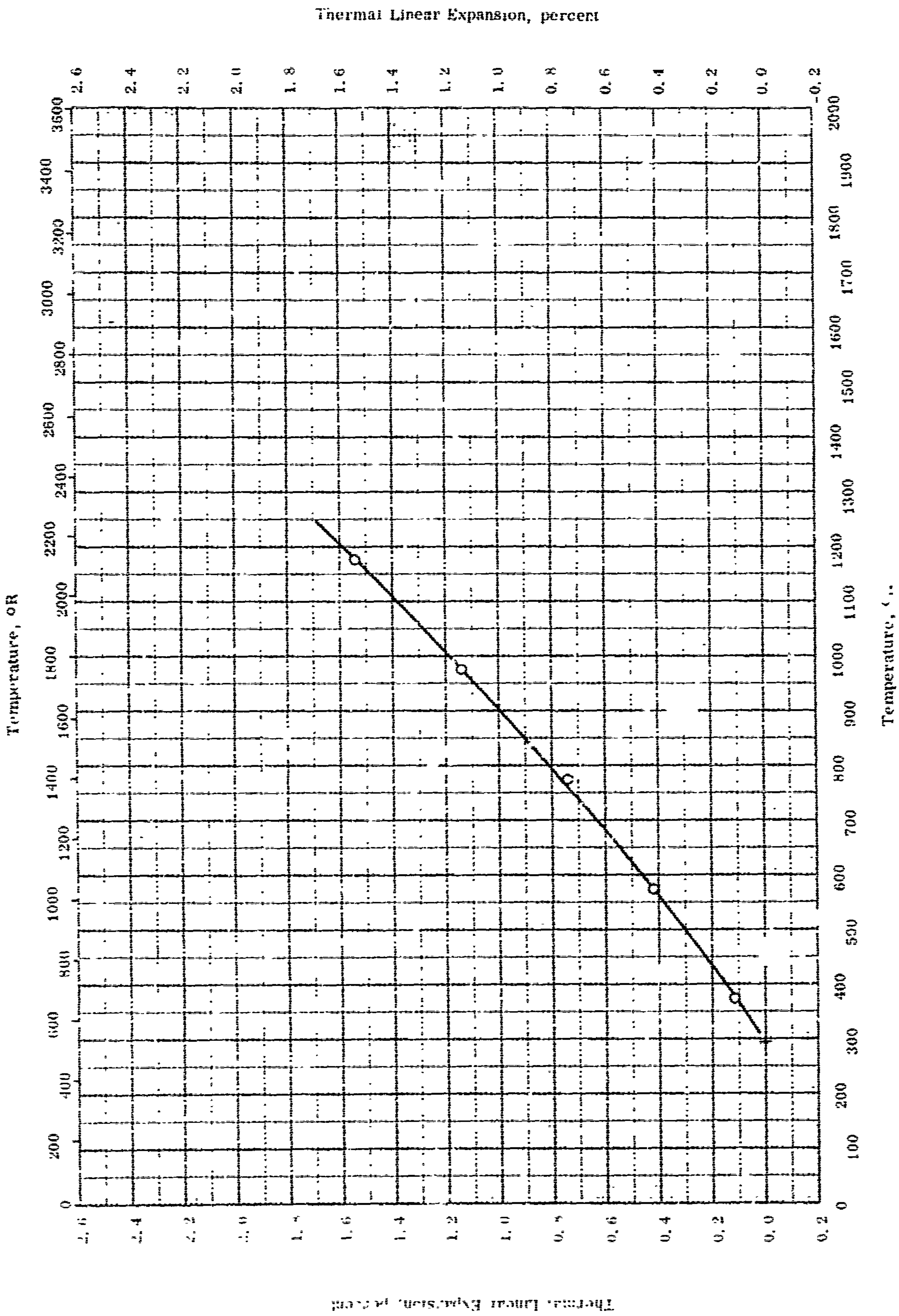
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-3	408-828	±4	S-816; 45.0 Co, 20.0 Cr, 20.0 Ni, and 15.0 Fe	
□	52-2	293-1073		Jessop G32 steel (British Design); 40.6 Co, 19.1 Cr, 10.5 Ni, 3.0 V, 2.2 Mo, 1.4 Nb, 0.77 Mn, 0.52 Si, 0.27 C; density 515 lb ft^{-3}.	
△	51-3	375-828	±4	X-40; 25.5 Cr, 10.5 Ni, 7.5 W, 2.0 Fe, 0.53 C.	
▽	60-5	478-1360		WI-52; 20 - 23 Cr, 10-12 W, 1.50 - 2.0 Nb + Ta, 1.5 - 2.0 Fe, 1.0 max Ni, 0.5 max Mn, 0.50 max Si, 0.04 max P, and 0.04 max S.	
◁	60-5	388-1341		Same as above.	
◇	60-5	388-1341		Same as above.	Chromium coated.
▷	60-9	533-811		GE - X - 63; 25 Cr, 10 Ni, 5 Mo, 3 Fe, 0.5 Mn, 0.5 Si, and 0.4 - 0.5 C.	
●	61-2	437-1337	<5	HE 1049; 43.0 Co, 26.0 Cr, 15.0 W, 10.0 Ni, 3.0 Fe, 0.8 Mn, 0.8 Si, 0.4 B, and 0.4 C.	Samples contained 5 one-inch dia discs.



THERMAL DIFFUSIVITY -- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-1	263-376	±6.8	Haynes Stellite 25; 21.0 Cr, 3.0 Fe, 2.0 Mn, 1.0 Si, and 0.15 C; approximate composition.	
□	56-2	294-922		S-816; 20 Cr, 20 Ni, 4.0 Fe, 4.0 Mo, 4.0 Nb, 4.0 W, 1.2 Mn, 0.4 Si, and 0.04 C; composition from Metal's Handbook.	

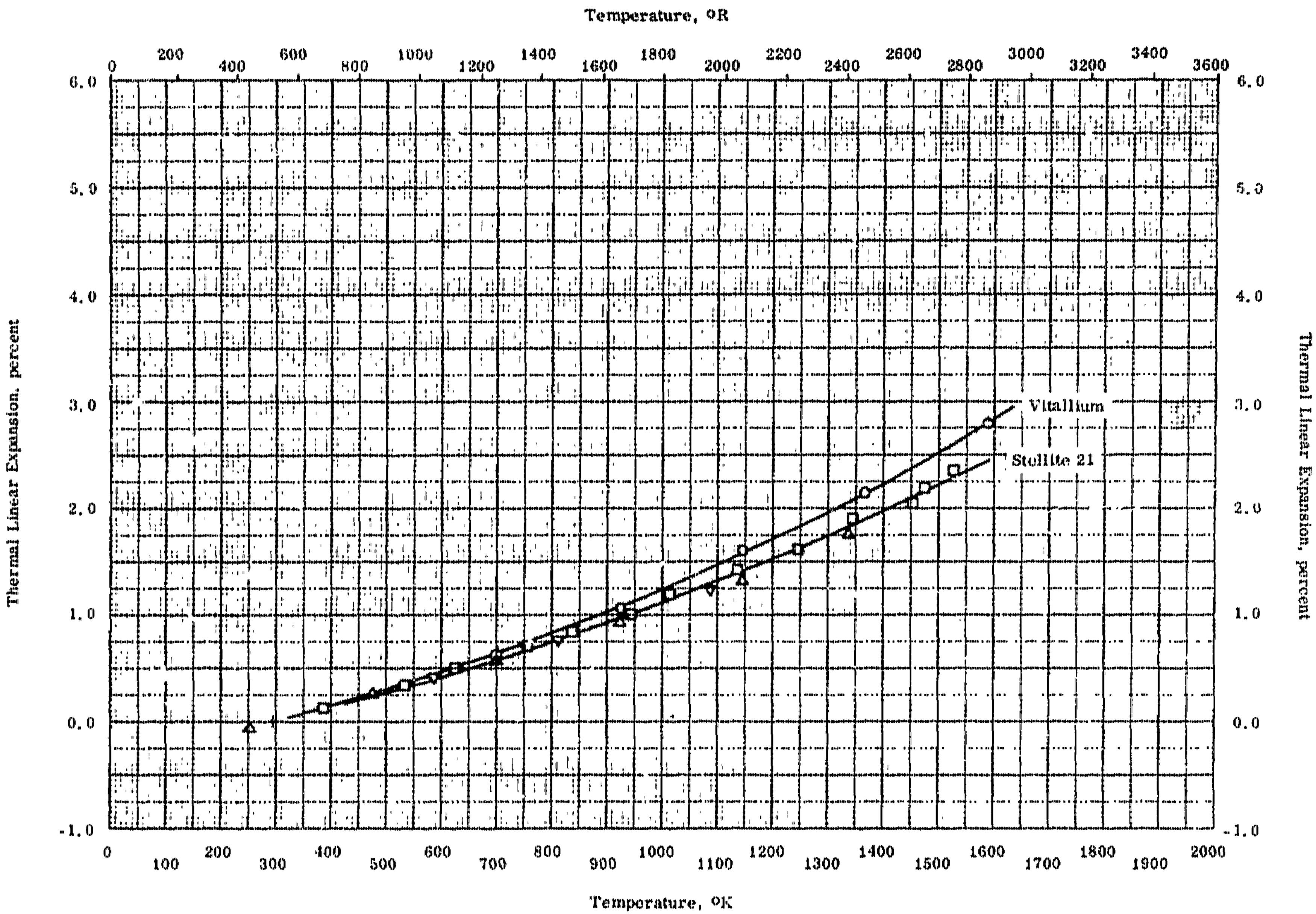


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(19.1 Cr and 15.64 Fe)

THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(19.1 Cr and 15.64 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-2	293-1173		Jessop G32 steel (British design.); 46.6 Co, 19.1 Cr, 15.64 Fe, 10.5 Ni, 3.0 V, 2.2 Mo, 1.4 Nb, 0.77 Mn, 0.52 Si, and 0.27 C.	Data given as appendix to paper presented at symposium.

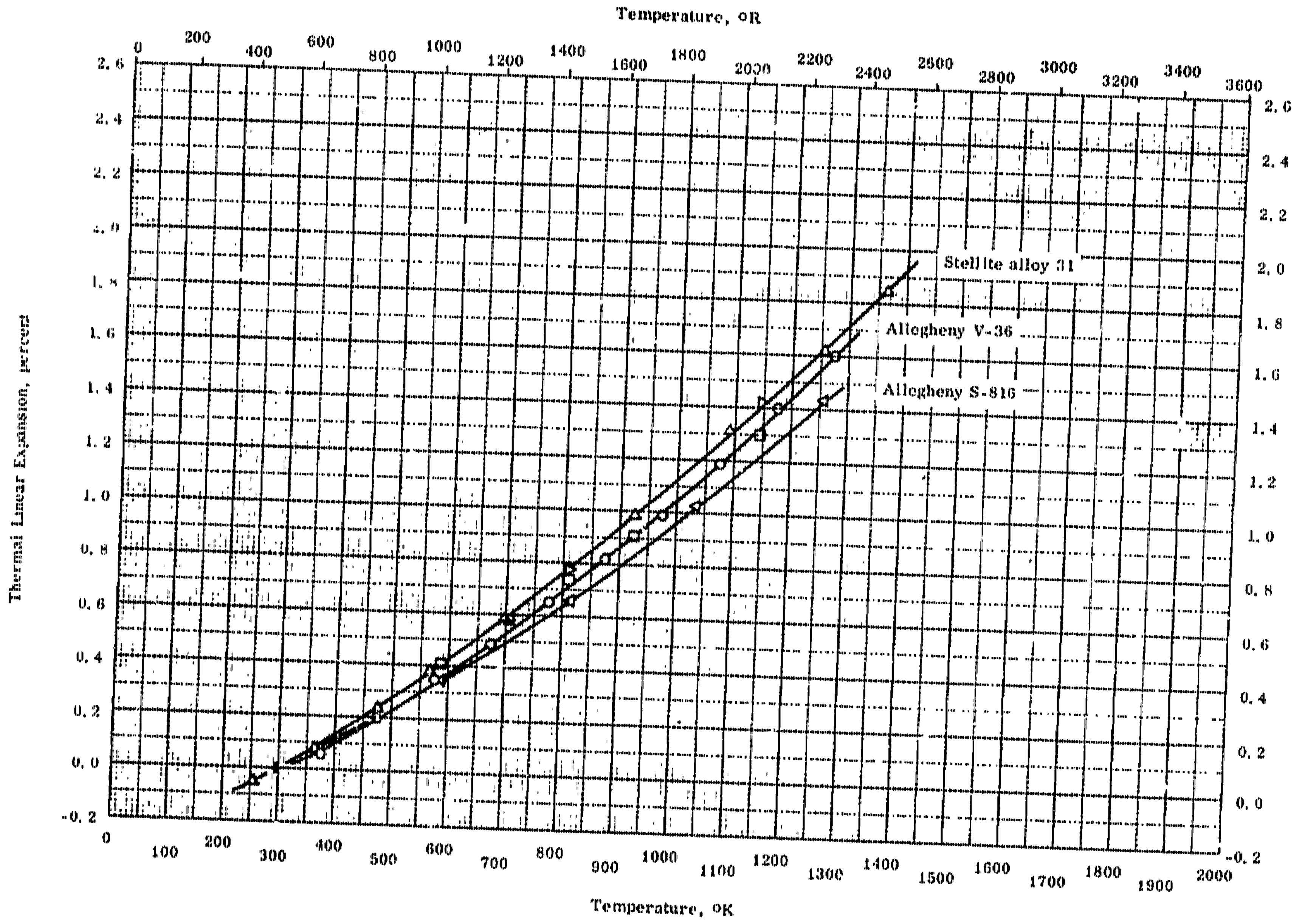


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(25 - 30 Cr and 4 - 7 Mo)

THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(25 - 30 Cr and 4 - 7 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-16	293-1589		Vitallium; 62.2 Co, 27.4 Cr, 5.5 Mo, 2.8 Ni, 0.7 Fe, 0.66 Mn, 0.53 Si, and 0.22 C.	Heating rate of 200 F sec^{-1}.
□	58-2	300-1525		Stellite 21; 60.49 Co, 26.69 Cr, 5.42 Mo, 2.38 Ni, 1.54 Fe, and 0.258 C; after testing, material analyzed as 62.27 Co, 26.74 Cr, 5.42 Mo, 2.42 Ni, 1.23 Fe, and 0.264 C; density 511.2 lb ft^{-3}.	
△	47-2 also 50-3	253-1339		Stellite 21 (NDRC No. NR-10; AMS No. 5385); 25.0 - 30.0 Cr, 4.5 - 6.5 Mo, 1.5 - 3.5 Ni, 2.0 max Fe, and 0.20 - 0.35 C; density 518 lb ft^{-3}.	Measured at Batelle Mem. Inst. for NDRC.
▽	58-27	294-1069		Haynes Stellite alloy No. 21; 56.94 - 63.54 Co, 25.50 - 29.00 Cr, 5.00 - 6.00 Mo, 2.00 Fe, 1.75 - 3.75 Ni, 1.00 Mn, 1.00 Si, 0.20 - 0.30 C, 0.007 B; density 8.30 g cm^{-3}, M.P. 1352 C, and electrical resistivity 87.4 microhm - cm at 24 C.	Expansion test made on investment-cast bar.

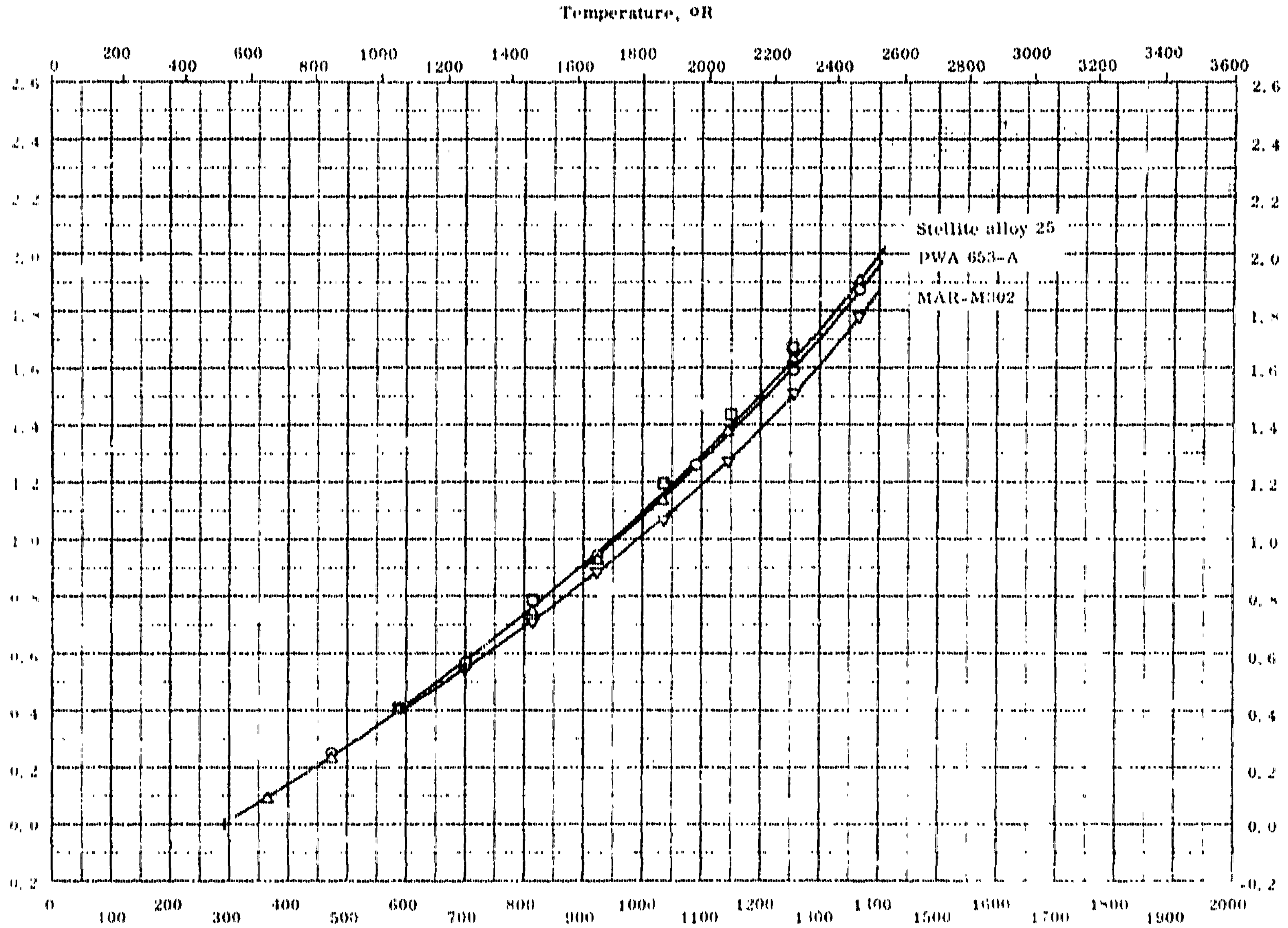


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX$_i$
(19 - 29 Cr and 9 - 21 Ni)

THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(19 - 29 Cr and 9 - 21 Ni)

REFERENCE INFORMATION

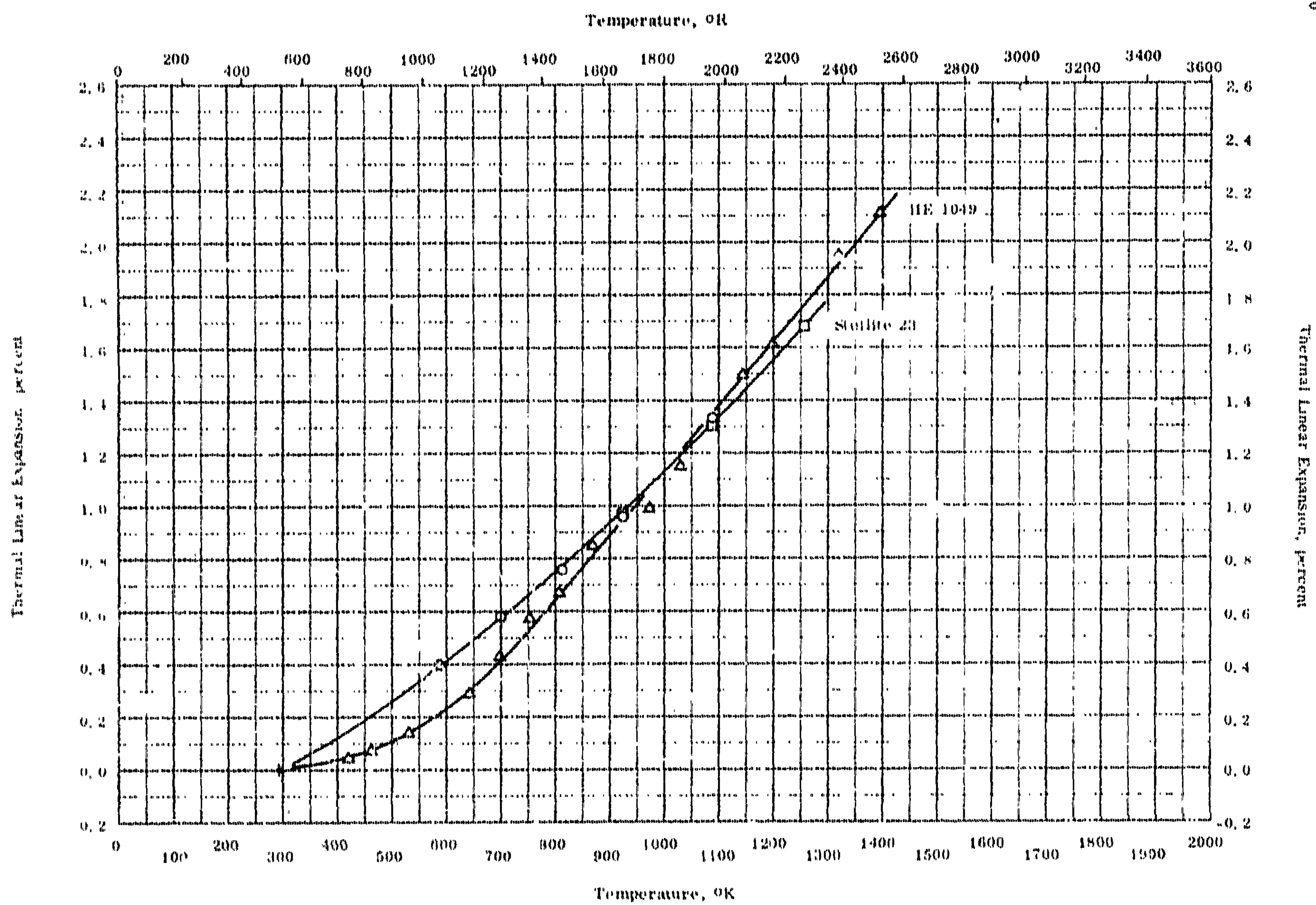
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	50-3	589-1145		Haynes Stellite Alloy No. 30 (NRDC No. NR-12; AMS-5380); nominal: 23 - 29 Cr, 13 - 17 Ni, 5 - 7 Mo, 2 max Fe, and 0.35 - 0.50 C.	
△	50-3	256-1366		Haynes Stellite Alloy No. 31 (NRDC No. NR-71; AMS - 5382); nominal: 23 - 28 Cr, 9 - 12 Ni, 6 - 9 W, 2 max Fe, and 0.45 - 0.60 C.	
▷	58-28	294-1144		Haynes Stellite Alloy No. 31; nominal: 49.45 - 54.55 Co, 24.5 - 26.5 Cr, 9.5 - 11.5 Ni, 7.00 - 8.00 W, 2.00 Fe, 1.00 Mn, 1.00 Si, and 0.45 - 0.55 C; density 8.61 g cm^{-3}.	Expansion test made on investment-cast bar.
○	61-25	294-1273		Allegheny V-36; 42 Co, 25 Cr, 20 Ni, 4 Mo, 3 Fe, 2 Nb, 2 W, 1 Mn, 0.50 Si, and 0.30 C; M.P. 2350 - 2450 F.	
◁	53-26	293-1255		Allegheny S-816; 40 - 44 Co, 19 - 21 Cr, 19 - 21 Ni, 5 Fe (max), 3.5 - 5 W, 3.5 - 4.5 Mo, 3.0 - 4.5 Nb + Ta, 1.8 max Mn, 0.9 max Si, and 0.32 - 0.42 C; density 0.313 lb in^{-3} and M.P. 2350 - 2450 F.	



THERMAL LINEAR EXPANSION — COBALT + CHROMIUM + ΣX_i
(19 - 23 Cr and 1 - 16 W)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-5	293-1167		PWA 653 - A (Haynes 152); 20 - 22 Cr, 10 - 12 W, 1.5 - 2.5 Nb + Ta, 1.0 - 2.5 Fe, 1.0 max Ni, 0.50 max Si and Mn each, 0.4 - 0.5 C, 0.04 max P, and 0.040 max S; nominal composition, density 0.321 lb in.$^{-3}$ and melting range 2400 - 2500 F.	As cast.
□	56-43	294-1255		Hastelloy No. 25; 52 Co, 20 Cr, 15 W, 10 Ni, and 0.1 C; nominal composition; density 0.313 lb in.$^{-3}$	Annealed at 2225 F for 30 min and air-cooled.
△	62-16	294-1366		Haynes Alloy No. 25; 45.85 - 52.95 Co, 19 - 21.0 Cr, 14 - 16.0 W, 9.0 - 11.0 Ni, 3.0 Fe, 1.0 - 2.0 Mn, 1.0 Si, and 0.05 - 0.15 C; density 9.13 g cm^{-3} and melting range 1329 - 1410 C.	
▽	64-11	293-1367		MAR-M302; former SM 302; 20 - 23.0 Cr, 9 - 11.0 W, 8 - 10 Ta, 1.5 max Fe, 0.78 - 0.93 C, 0.4 max Si, 0.1 - 0.3 Zr, 0.2 max Mn, and 0.010 max B; density 0.333 lb in.$^{-3}$ and melting range 2400 - 2450 F	As cast.

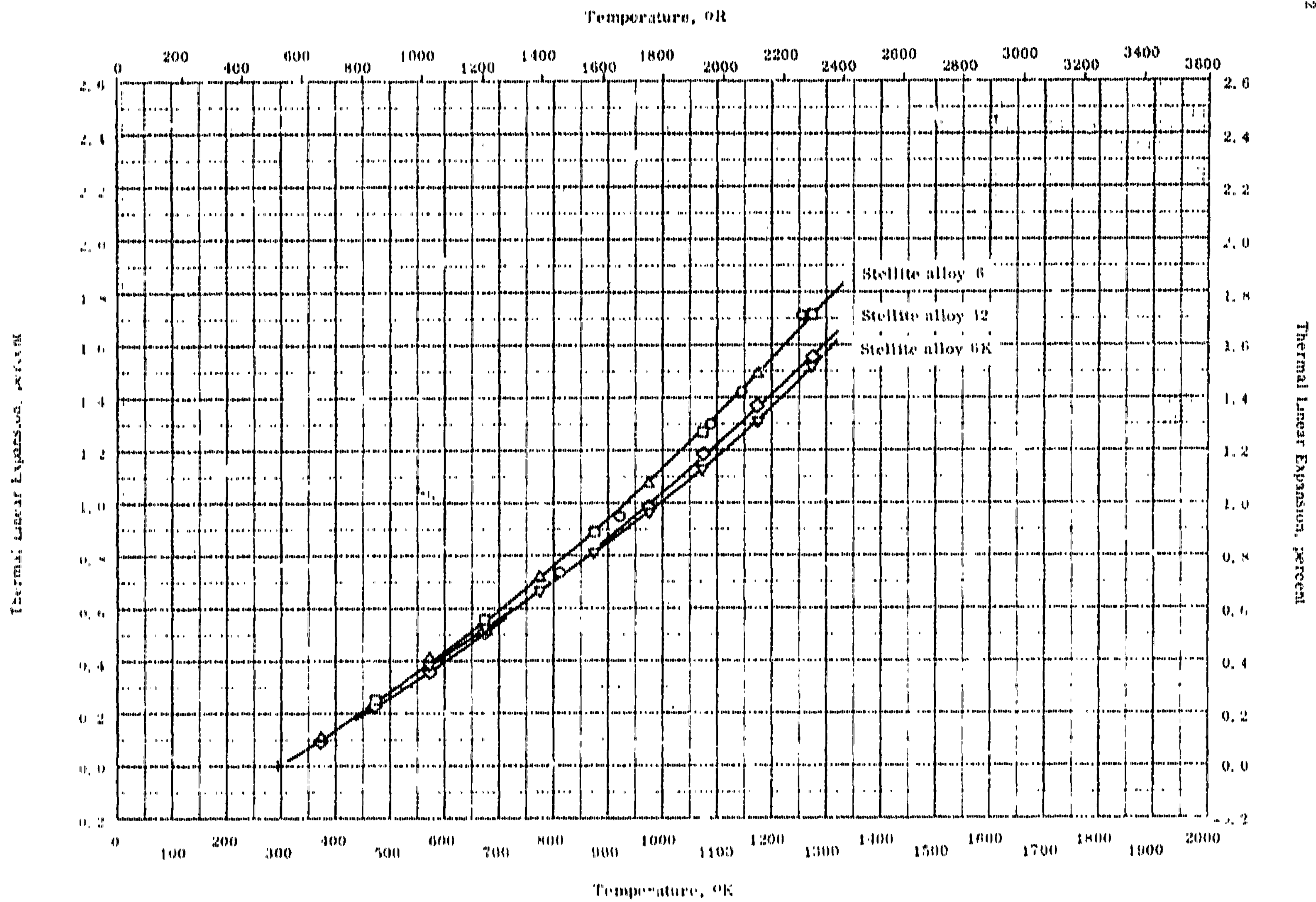


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(23 - 29 Cr and 4 - 15 W)

THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(23 - 29 Cr and 4 - 15 W)

REFERENCE INFORMATION

Symbol	Ref	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-3	589-1089		Stellite 23 (NDRC 61; AMS-5375); 23 - 29 Cr, 4 - 7 W, 2 max Fe, 1.5 max Ni, and 0.35 - 0.50 C; density 533 lb ft^{-3}.	
□	56-43	294-1255		Haynes HE 1049; 45 Co 26 Cr, 15 W, 10 Ni, 0.4 B, and 0.4 C.	As precision cast; data estimated from a similar alloy.
△	61-2	300-1395		Haynes Stellite HE 1049; 43.6 Co, 26.0 Cr, 15.0 W, 10.0 Ni, 3.0 Fe, 0.8 Si, 0.8 Mn, 0.40 C, and 0.4 B; density 8.85 g cm^{-3}.	

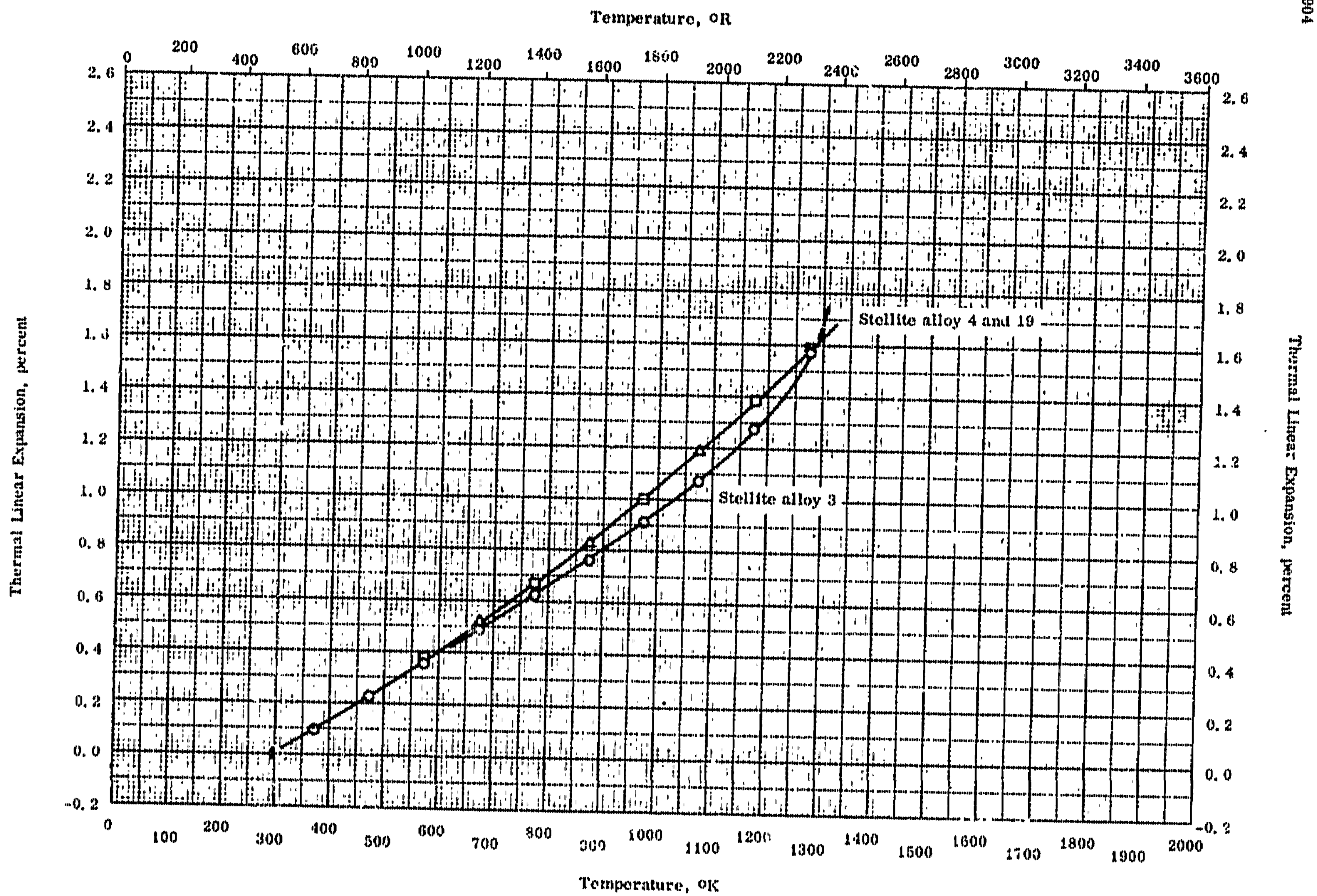


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(30 - 33 Cr and 4 - 9 W)

THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(30 - 31 Cr and 4 - 9 W)

REFERENCE INFORMATION

Symbol	Ref	Temp. Range °K	Rept Error %	Sample Specifications	Remarks
○	52-14	293-1256		64 Co, 30 Cr, and 6 W; nominal composition; density 526 lb ft^{-3}.	Powders mixed 15 hrs, pressed at 35 tons in.$^{-2}$, sintered at 1325 C for 8 hrs in dry hydrogen.
□	62-25	273-1273		Haynes Stellite Alloy No. 6; 54.6 Co, 30 Cr, 4.5 W, 3 Ni, 3 Fe, 1.5 Si, 1.5 Mo, 1.1 C, and 1 Mn; nominal composition; density 8.38 g cm^{-3} and melting point 1275 C.	
△	62-25	273-1273		Haynes Stellite Alloy No. 6 B; 53.9 Co, 30 Cr, 4.5 W, 3 Ni, 3 Fe, 2 Si, 2 Mn, 1.5 Mo, and 1.1 C; density 8.38 g cm^{-3} and melting range 1265 - 1354 C.	
▽	62-25	273-1273		Haynes Stellite Alloy No. 6 K; 51.4 Co, 31 Cr, 4.5 W, 3 Ni, 3 Fe, 2 Si, 2 Mn, 1.6 C, and 1.5 Mo; density 8.38 g cm^{-3} and melting range 1281 - 1306 C.	
◇	62-25	273-1273		Haynes Stellite Alloy No. 12; 50.65 Co, 30.5 Cr, 8.5 W, 3 Ni, 3 Fe, 1.35 C, 1 Si, 1 Mn, and 1.0 others; nominal composition; density 8.62 g cm^{-3} and melting point 1263 C.	

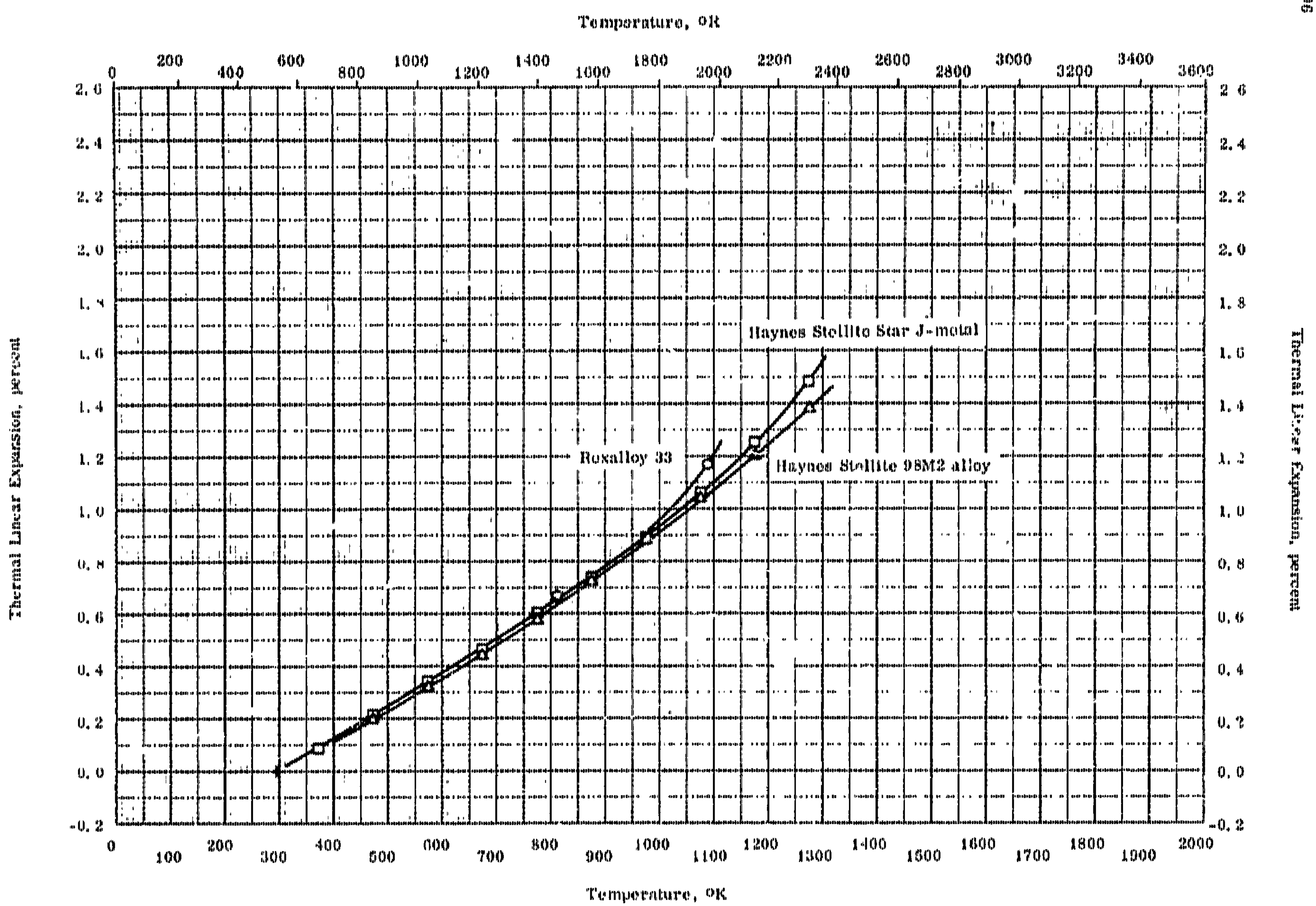


THERMAL LINEAR EXPANSION — COBALT + CHROMIUM + ΣX_i
(30 - 31 Cr and 10 - 14 W)

THERMAL LINEAR EXPANSION — COBALT + CHROMIUM + ΣX_i
(30 - 31 Cr and 10 - 14 W)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-25	273-1273		Haynes Stellite Alloy No. 3; 45.55 Co, 30.5 Cr, 12.5 W, 3 Ni, 3 Fe, 1 Mn, 1 Si, and 1.0 others; nominal composition; density 8.64 g cm^{-3} and melting range 1235 - 1320 C.	
□	62-25	273-1273		Haynes Stellite Alloy No. 4; 45.0 Co, 30 Cr, 14 W, 3 Ni, 3 Fe, 1.5 Si, 1.5 Mo, 1.0 Mn, and 1.0 C; nominal composition; density 8.79 g cm^{-3} and melting range 1247 - 1356 C.	
△	62-25	293-1273		Haynes Stellite Alloy No. 19; 46.8 Co, 31 Cr, 10.5 W, 3 Ni, 3 Fe, 1.7 C, 1 Si, 1 Mn, and 1.0 others; nominal composition; density 8.30 g cm^{-3} and melting range 1250 - 1298 C.	

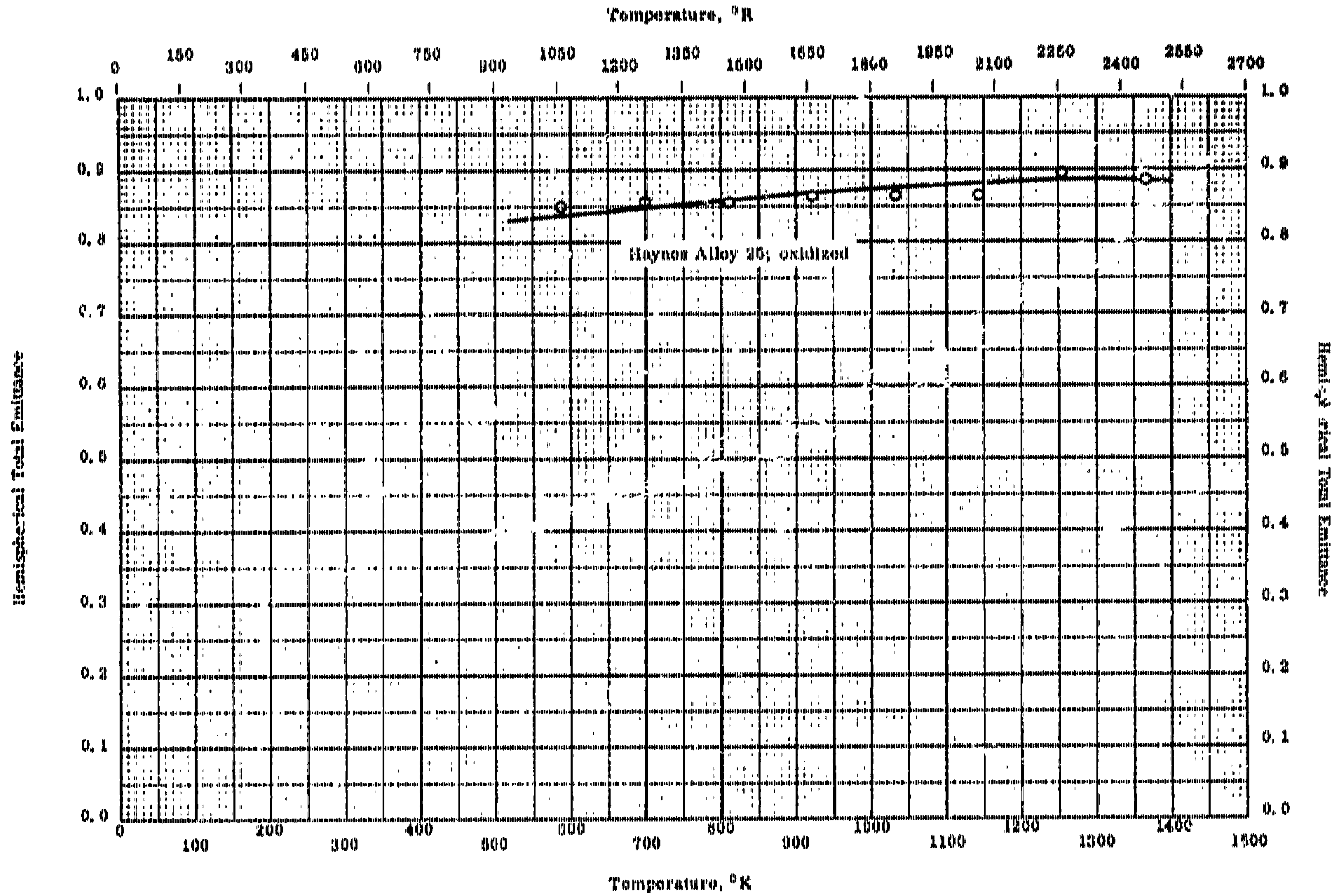


THERMAL LINEAR EXPANSION -- COBALT + CHROMIUM + ΣX_i
(30 - 33 Cr and 17 - 19 W)

THERMAL LINEAR EXPANSION — COBALT + CHROMIUM + ΣX_i
(30 - 33 Cr and 17 - 19 W)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-32	302-1089		Rexalloy 33; 44 Co, 33 Cr, 17 W, 2.25 C, 2.00 max Fe, and 0.75 Si; density 0.317 lb in.$^{-3}$ and melting point 2290 F.	
□	62-25	273-1273		Haynes Stellite Star J-metal; 39 Co, 32 Cr, 17 W, 3 Fe, 2.5 C, 2.5 Ni, 1.0 Si, 1.0 Mn, and 2.0 others; nominal composition; density 8.76 g cm^{-3} and melting 1166 - 1332 C.	
△	62-26	293-1273		Haynes Stellite 98M2 Alloy; 34.7 Co, 30 Cr, 18.5 W, 4 V, 3.5 Ni, 2.5 Fe, 2.0 C, 1.0 Si, 1.0 Mn, 0.8 Mo, and 2.0 others; density 8.63 g cm^{-3} and melting range 1139 - 1314 C.	



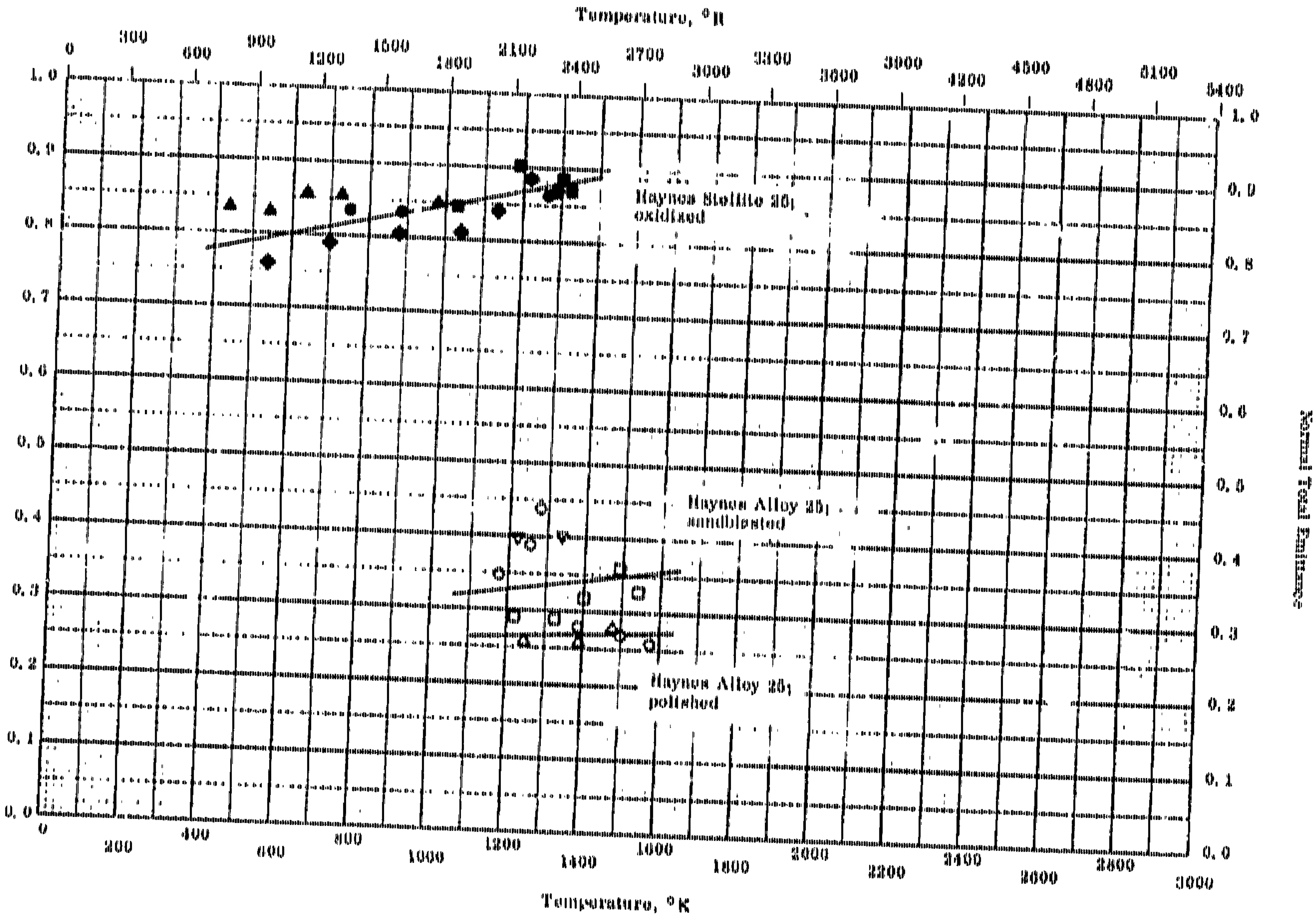
TPRC

HEMISPHERICAL TOTAL EMITTANCE -- COBALT + CHROMIUM + ΣX$_i$

HEMISPHERICAL TOTAL EMITTANCE — COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-17	589-1366		Haynes alloy No. 25; nominal: 19 - 21 Cr, 14 - 16 W, 9 - 11 Ni, 3 max. Fe, 1 - 2 Mn, 0.05 - 0.15 C, 0.04 max. P, 1 max. Si, 0.03 max. S.	Cleaned, polished, washed, and stably oxidized in air at 1366 K for 30 min.

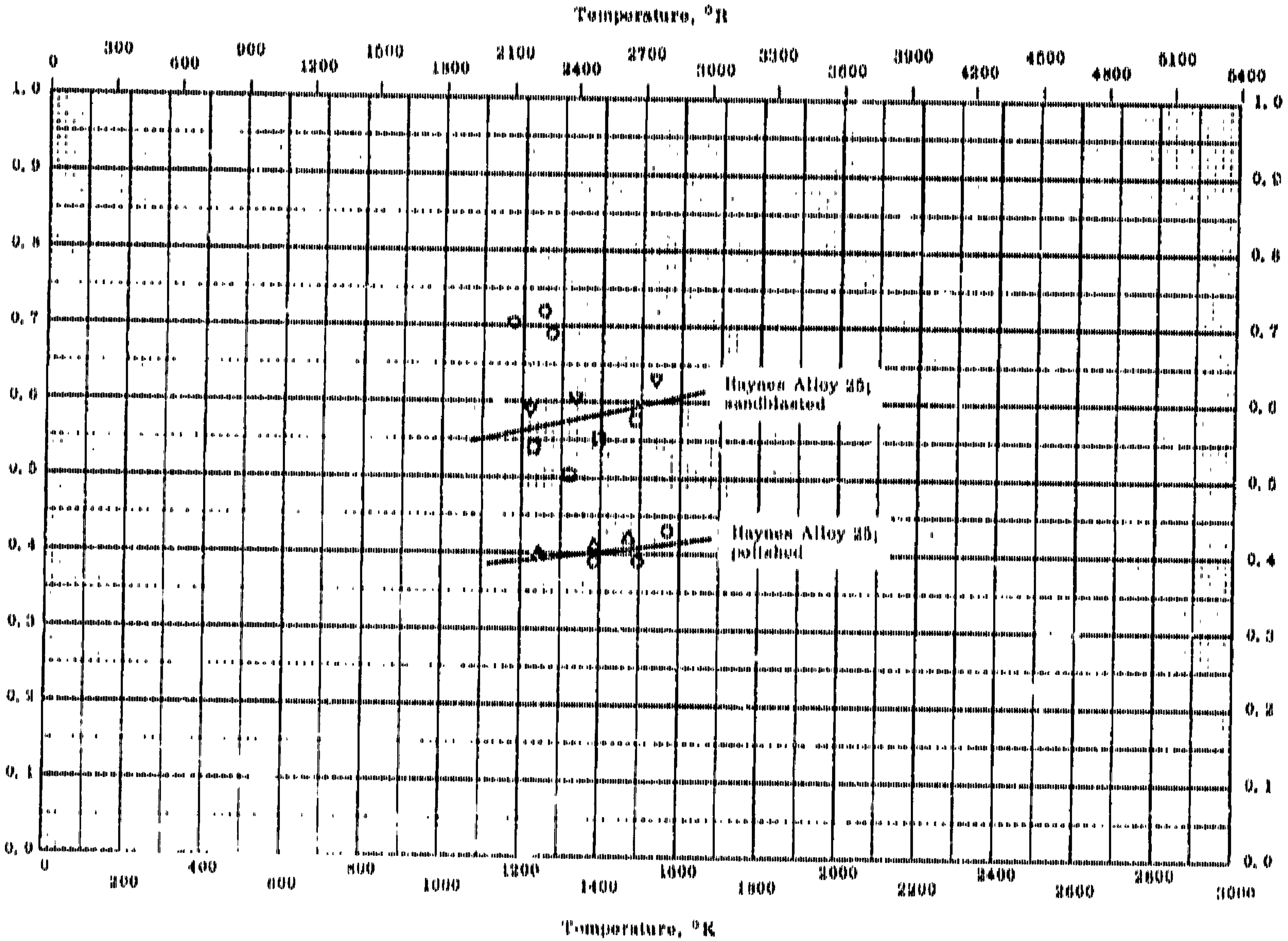


NORMAL TOTAL EMITTANCE — COBALT + CHROMIUM + ΣX_i

NORMAL TOTAL EMITTANCE -- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

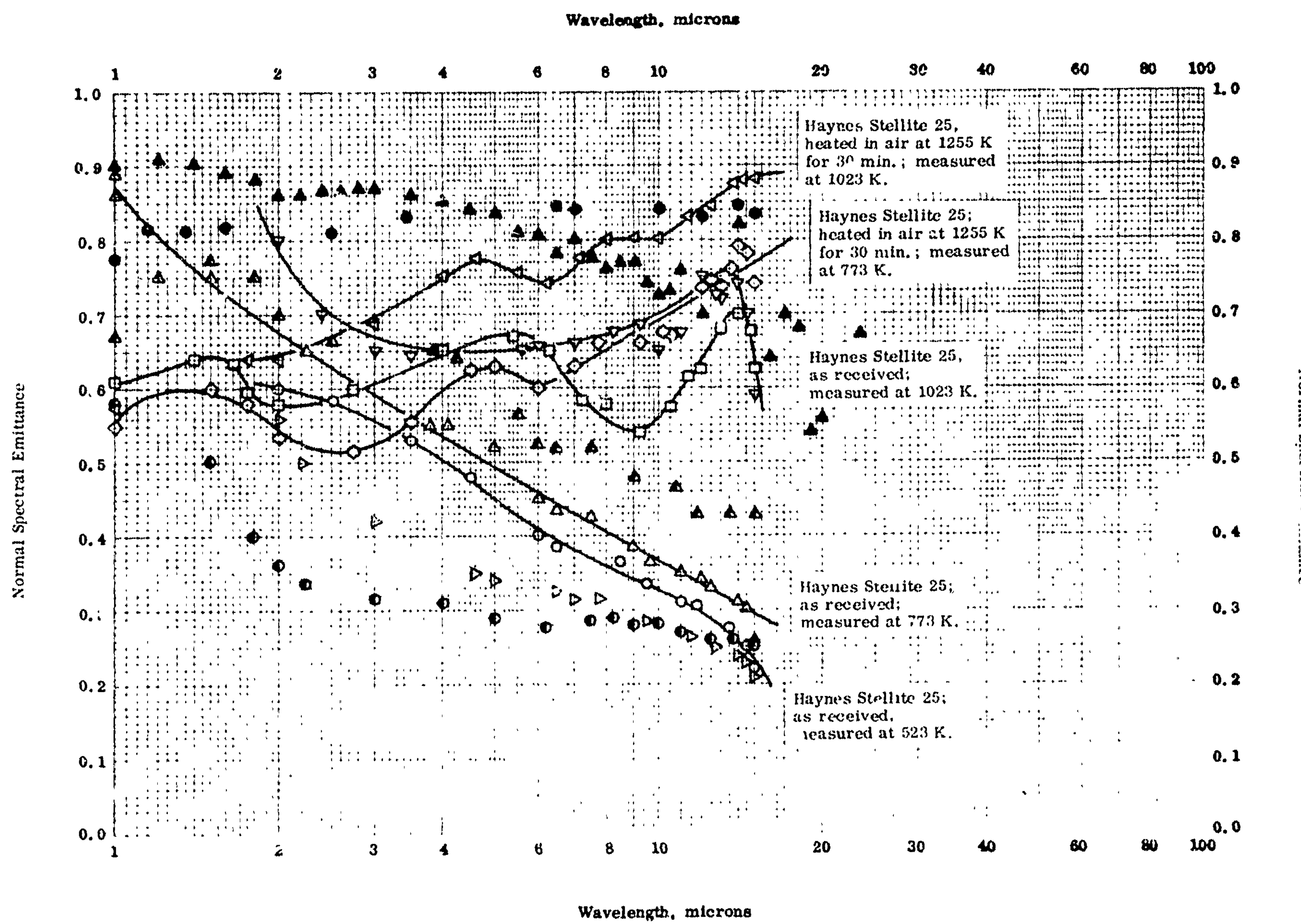
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-21	1177-1672		Haynes alloy 25 (L-605), nominal: 19-21 Cr, 14-16 W, 9-11 Ni, 3 max. Fe, 1-2 Mn, 0.05 - 0.15 C, 0.04 max. P, 1 max. Si and 0.03 max. S; surface roughness 0.7 - 1.0 μ RMS.	Polished; measured in vacuum (3-4 μ Hg); heating.
△	63-21	1240-1477		Same as above.	The above specimen, cooling.
□	63-21	1222-1538		Haynes alloy 25 (L-605); surface roughness 70 - 90 μ RMS.	Sandblasted; measured in vacuum of 3 - 4 μ Hg; heating.
▽	63-21	1222-1336		Same as above.	The above specimen, cooling.
●	60-20	740-1227		Haynes Stellite 25 (68176); surface roughness: (as received) fine structure 2.5 microns, coarse structure 6 microns at 250 microns intervals and (fully aged) fine structure 2.5 microns, coarse structure 1 micron at 2500 micron intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air, measured in increasing temperatures.
▲	60-20	436-980		Same as above.	The above specimen measured in decreasing temperature.
■	60-20	1035-1322		Same as above. (Received from Boeing).	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air; measured in increasing temperatures.
◆	60-20	840-1211		Same as above.	The above specimen measured in decreasing temperatures.



NORMAL SPECTRAL EMITTANCE COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

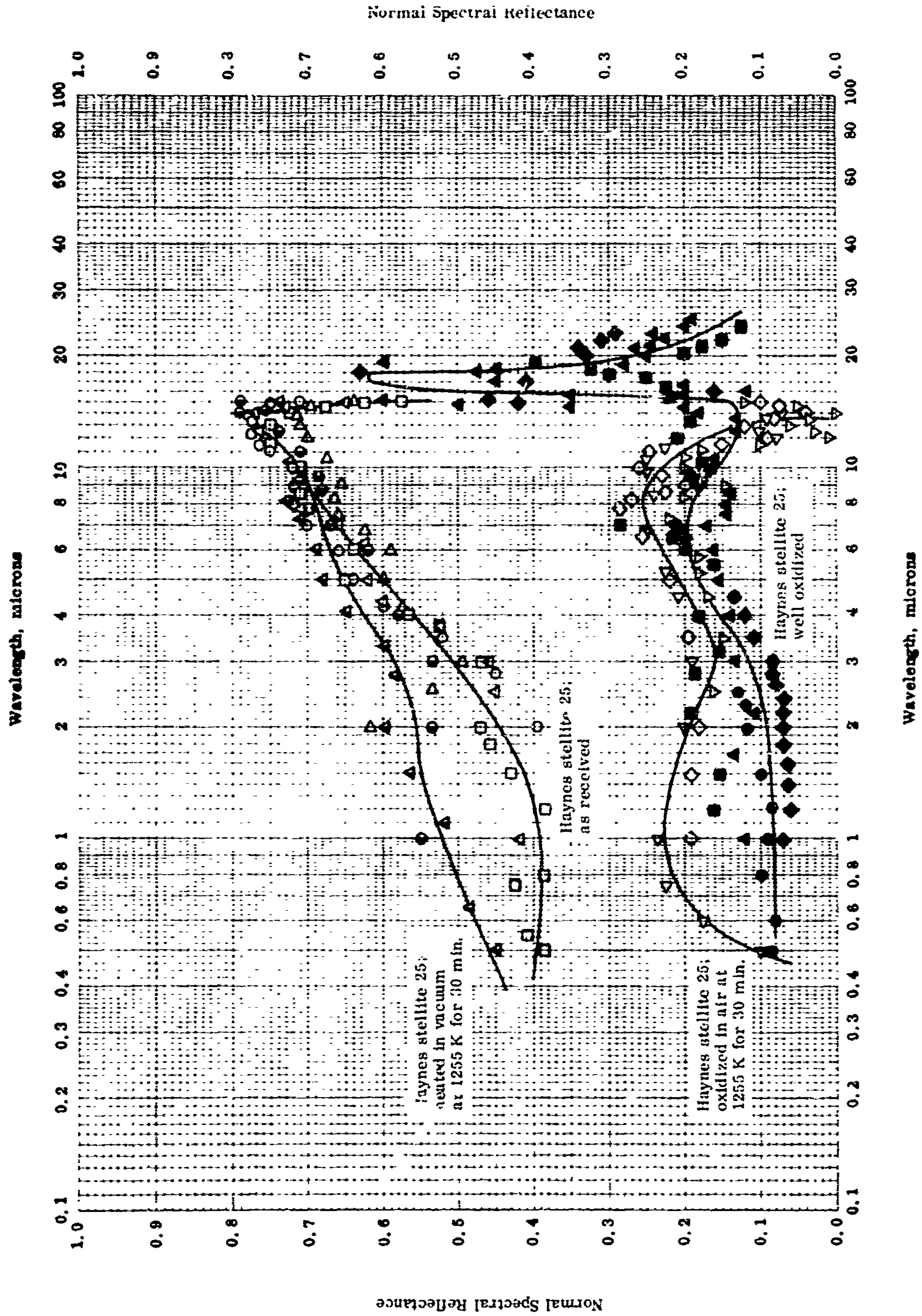
Symbol	Ref.	Wavelength μ	Temp. Range, K	Rept. Error %	Sample Specifications	Remarks
○	63 21	0.65	1177-1573		Haynes alloy 25 (L-605); nominal: 19-21 Cr, 14-16 W, 9-11 Ni, 3 max. Fe, 1-2 Mn, 0.05-0.15 C, 0.04 max. P, 1 max. Si and 0.03 max. S; surface roughness 0.7-1.0 μ RMS.	Polished; measured in vacuum of 3-4 μ Hg; heating.
△	63 41	0.65	1340-1477		Same as above.	The above specimen; cooling.
□	63 21	0.65	1233-1488		Haynes alloy 25 (L-605); surface roughness 70-80 μ RMS.	Sandblasted; measured in vacuum of 3-4 μ Hg, heating.
▽	63 21	0.65	1222-1538		Same as above.	The above specimen; cooling.



NORMAL SPECTRAL EMITTANCE-- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	523.2	2.00-15.00		Haynes Stellite 25; nominal: 19-21 Cr, 14-16 W, 9-11 Ni, 3 max. Fe, 1-2 Mn, 0.05-0.15 C, 0.04 max. P, 1 max. Si, 0.03 max. S; commercial.	As received.
△	62-19	773.2	1.00-15.00		Same as above.	As received.
□	62-19	1023	1.00-15.00		Same as above.	As received.
▽	62-19	523.2	2.00-15.00		Haynes Stellite 25; commercial.	Heated in air at 1255 K for 30 min.
◇	62-19	773.2	1.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.
◁	62-19	1023	1.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.
▷	62-19	523.2	2.00-15.00		Haynes Stellite 25; commercial.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.
◐	62-19	773.2	1.00-15.00		Same as above.	Same treatment as above.
◭	62-19	1023	1.00-15.00		Same as above.	Same treatment as above.
●	60-20	1033.2	1.00-15.00		HS-25 (SS8178); surface roughness: fine structure 2.5μ, coarse structure 1μ in 2500μ intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air.
▲	62-22	1027.6	1.00-23.50		HS-25.	Well oxidized.



NORMAL SPECTRAL REFLECTANCE -- COBALT + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	< 322	2.00-15.00		Commercial Haynes Stellite 25; nominal: Bal. Co, 19 - 21 Cr, 14 - 16 W, 9 - 11 Ni, 3 max. Fe, 1 - 2 Mn, 0.05 - 0.15 C, 0.04 max. P, 1 max. Si, 0.03 max. S.	As received; 523.2 K source.
△	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
□	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
▽	62-19	< 322	2.00-15.00		Commercial Haynes Stellite 25.	Heated in air at 1255 K for 30 min., 523.2 K source.
◇	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◁	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
▷	62-19	< 322	2.00-15.00		Commercial Haynes Stellite 25.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min., 523.2 K source.
◐	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◭	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
●	60-20	294	0.5-2.5		HS-25 (SS8178); surface roughness: fine structure 2.5μ, coarse structure 1μ in 2500μ intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air.
▲	60-20	294	1.0-25.0		HS-25 (SS8178); surface roughness: fine structure 2.5μ, coarse structure 1μ in 2500μ intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs. at 1200 K in air.
■	60-20	825.4	1.20-24.0		Same as above.	The above specimen measured at 825.4 K.
◆	62-22	294	1.00-23.00		HS-25.	Well oxidized.

PROPERTIES OF COBALT + COPPER + ΣX_i

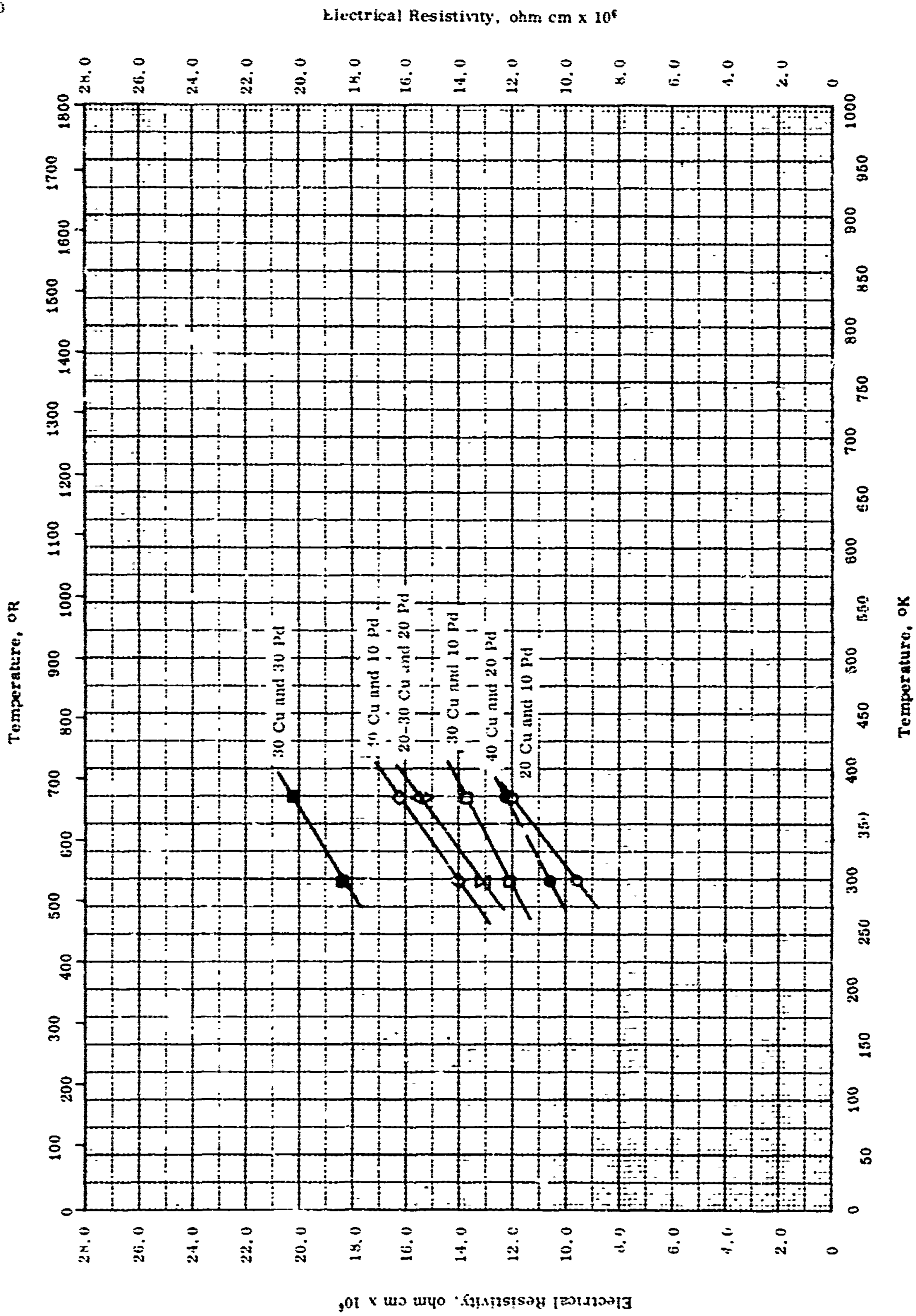
REPORTED VALUES

Melting Point:	K	R
○ 30 Cu and 10 Pd	1389	2500
□ 40 Cu and 10 Pd	1389	2500
△ 30 Cu and 20 Pd	1396	2513
▽ 40 Cu and 20 Pd	1415	2547
◇ 30 Cu and 30 Pd	1418	2553

PROPERTIES OF COBALT + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1389		60 Co, 30 Cu, and 10 Pd; from electrolytic Cu and Co with 0.01 % C.	M.P. by breaking time-temperature curve during cooling.
□	56-24	1389		50 Co, 40 Cu, and 10 Pd; same as above.	Same as above.
△	56-24	1396		50 Co, 30 Cu, and 20 Pd; same as above.	Same as above.
▽	56-24	1415		40 Co, 40 Cu, and 20 Pd; same as above.	Same as above.
◇	56-24	1418		40 Co, 30 Cu, and 30 Pd; same as above.	Same as above.



ELECTRICAL RESISTIVITY -- COBALT + COPPER + ΣX_i

ELECTRICAL RESISTIVITY -- COBALT + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		70 Co, 20 Cu, and 10 Pd.	Annealed 150 hrs at 1000 C in vacuum and cooled in 10 hrs.
□	56-24	298-373		60 Co, 30 Cu, and 10 Pd.	Same as above.
△	56-24	298-373		60 Co, 20 Cu, and 20 Pd.	Same as above.
◇	56-24	298-373		50 Co, 40 Cu, and 10 Pd.	Same as above.
▽	56-24	298-373		50 Co, 30 Cu, and 20 Pd.	Same as above.
●	56-24	298-373		40 Co, 40 Cu, and 20 Pd.	Same as above.
■	56-24	298-373		40 Co, 30 Cu, and 30 Pd.	Same as above.

PROPERTIES OF COBALT + GOLD - ΣX_i

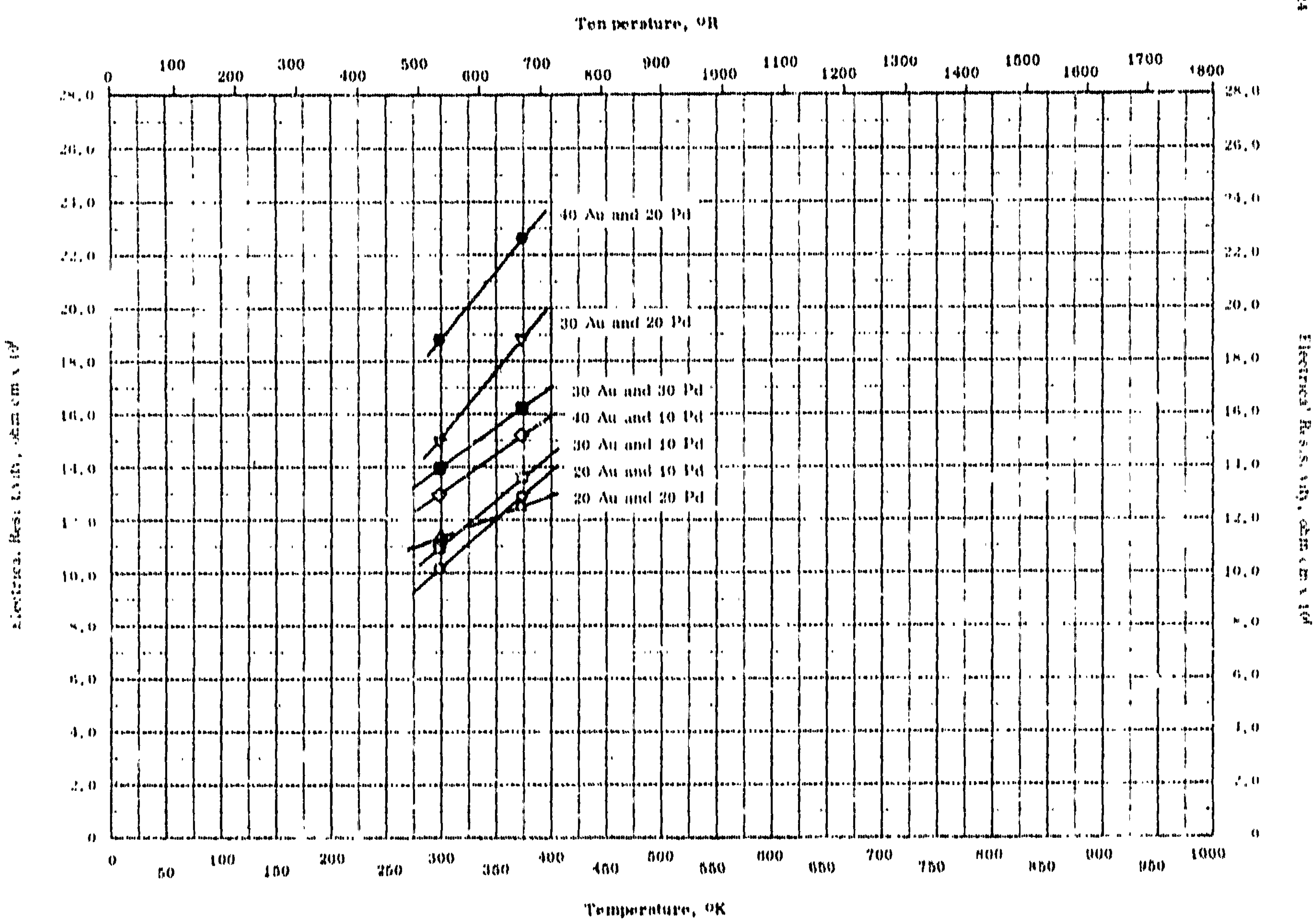
REPORTED VALUES

Melting Point:		K	R
○	20 Au and 10 Pd	1333	2400
□	30 Au and 10 Pd	1323	2352
△	20.3 Au and 20.2 Pd	1402	2524
▽	40 Au and 10 Pd	1318	2373
◁	30 Au and 20 Pd	1372	2470
▷	40 Au and 20 Pd	1463	2634
◇	30 Au and 30 Pd	1463	2634

PROPERTIES OF COBALT + GOLD + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	1333		70 Co, 20 Au, and 10 Pd; ingredients with < 0.01 impurities.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled.
□	56-25	1323		60 Co, 30 Au, and 10 Pd; same as above.	Same as above.
△	56-25	1402		59.5 Co, 20.3 Au, 20.2 Pd; same as above.	Same as above.
▽	56-25	1318		50 Co, 40 Au, and 10 Pd; same as above.	Same as above.
◁	56-25	1372		50 Co, 30 Au, and 20 Pd; same as above.	Same as above.
▷	56-25	1463		40 Co, 40 Au, and 20 Pd; same as above.	Same as above.
◇	56-25	1463		40 Co, 30 Au, and 30 Pd; same as above.	Same as above.

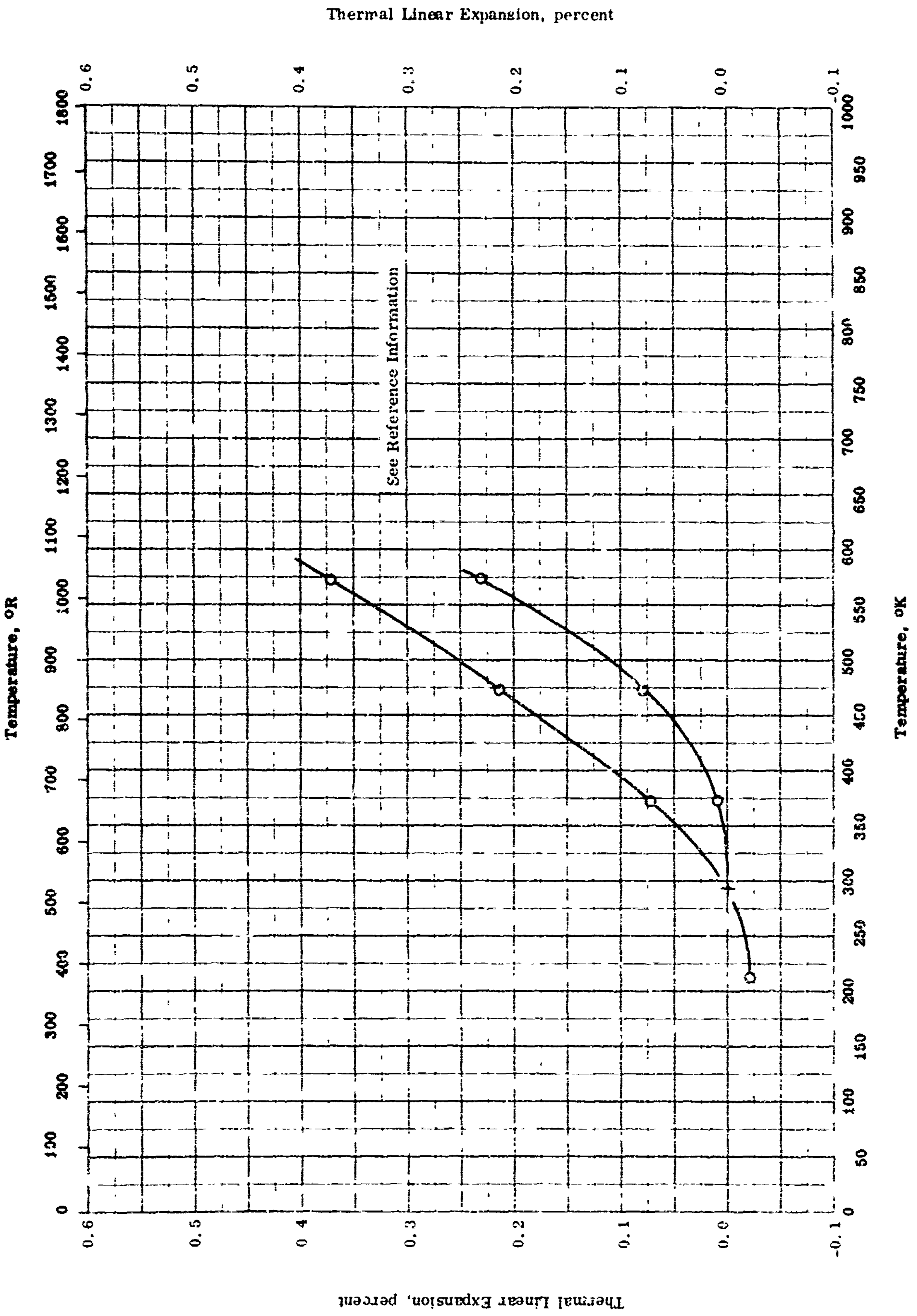


ELECTRIC RESISTIVITY — COBALT + GOLD + ΣX_i

ELECTRIC RESISTIVITY - COBALT + GOLD + ΣX_i

REFERENCE INFORMATION

Symbol	Ref	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56, 25	298-373		70 Co, 20 Au, and 10 Pd.	Annealed 100-150 hrs close to solidus temperature in vacuum and cooled slowly to room temperature.
□	56, 25	298-373		60 Co, 30 Au, and 10 Pd.	Same as above.
△	56, 25	298-373		51.5 Co, 20.3 Au, and [illegible] Pd.	Same as above.
◇	56, 25	298-373		50 Co, 40 Au and 10 Pd.	Same as above.
▽	56, 25	298-373		50 Co, 30 Au, and 20 Pd.	Same as above.
●	56, 25	298-373		30 Co, 30 Au, and 40 Pd.	Same as above.
■	56, 25	298-373		40 Co, 30 Au, and 30 Pd.	Same as above.

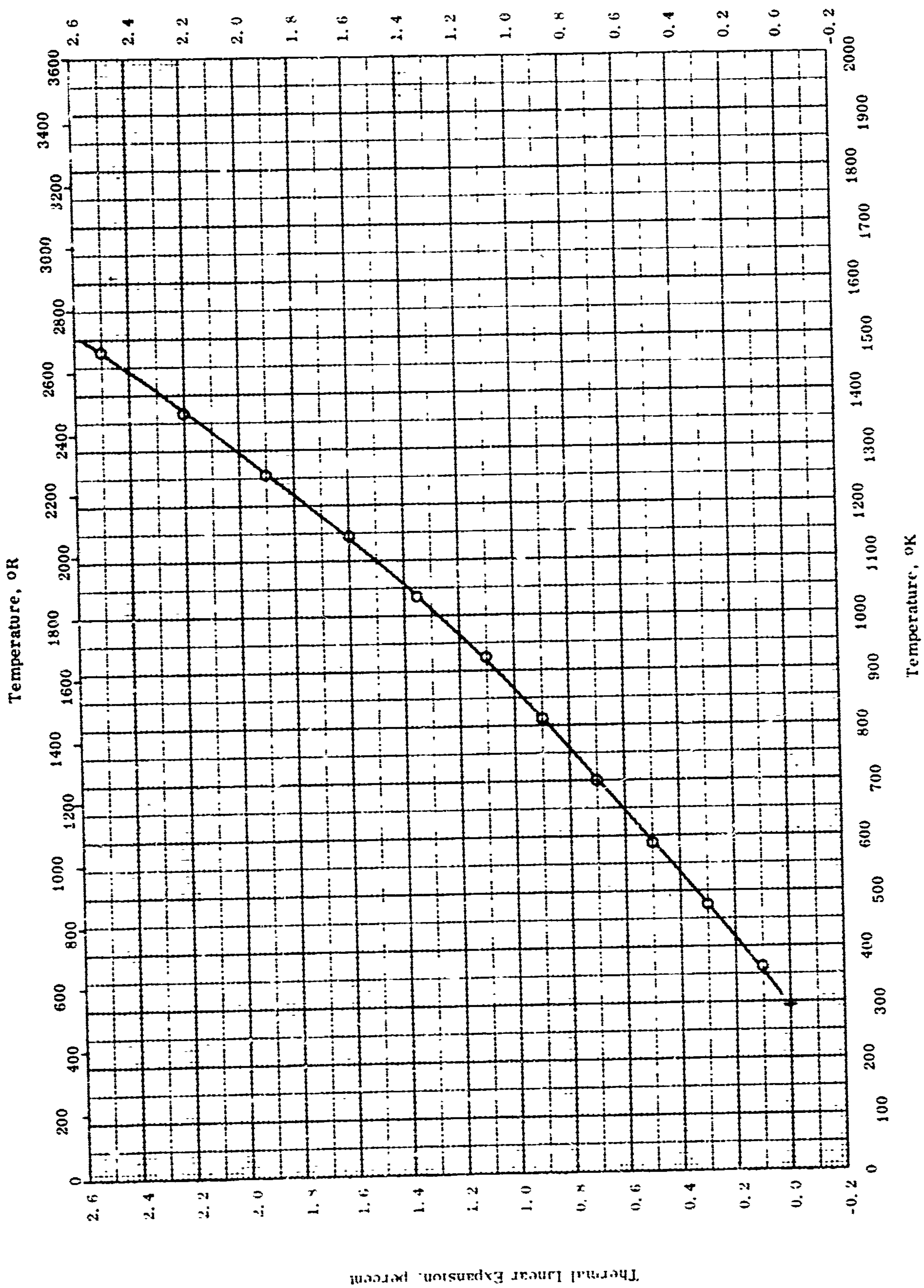


THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_1
(36 - 37 Fe and 8.5 - 9.9 Cr)

THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_i
(36 - 37 Fe and 8.5 - 9.9 Cr)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	55-37	213-573		19 stabilized samples: between 53.1 - 54.32 Co, 36.22 - 37.2 Fe, 8.56 - 9.87 Cr, < 0.33 Si, < 0.11 C, and < 0.10 Mn; α and/or γ phase.	H_2 annealed 1 hr at 1000 C and furnace-cooled over 20 hrs; expansion extremes are plotted; author gives detailed data for materials within given composition range.

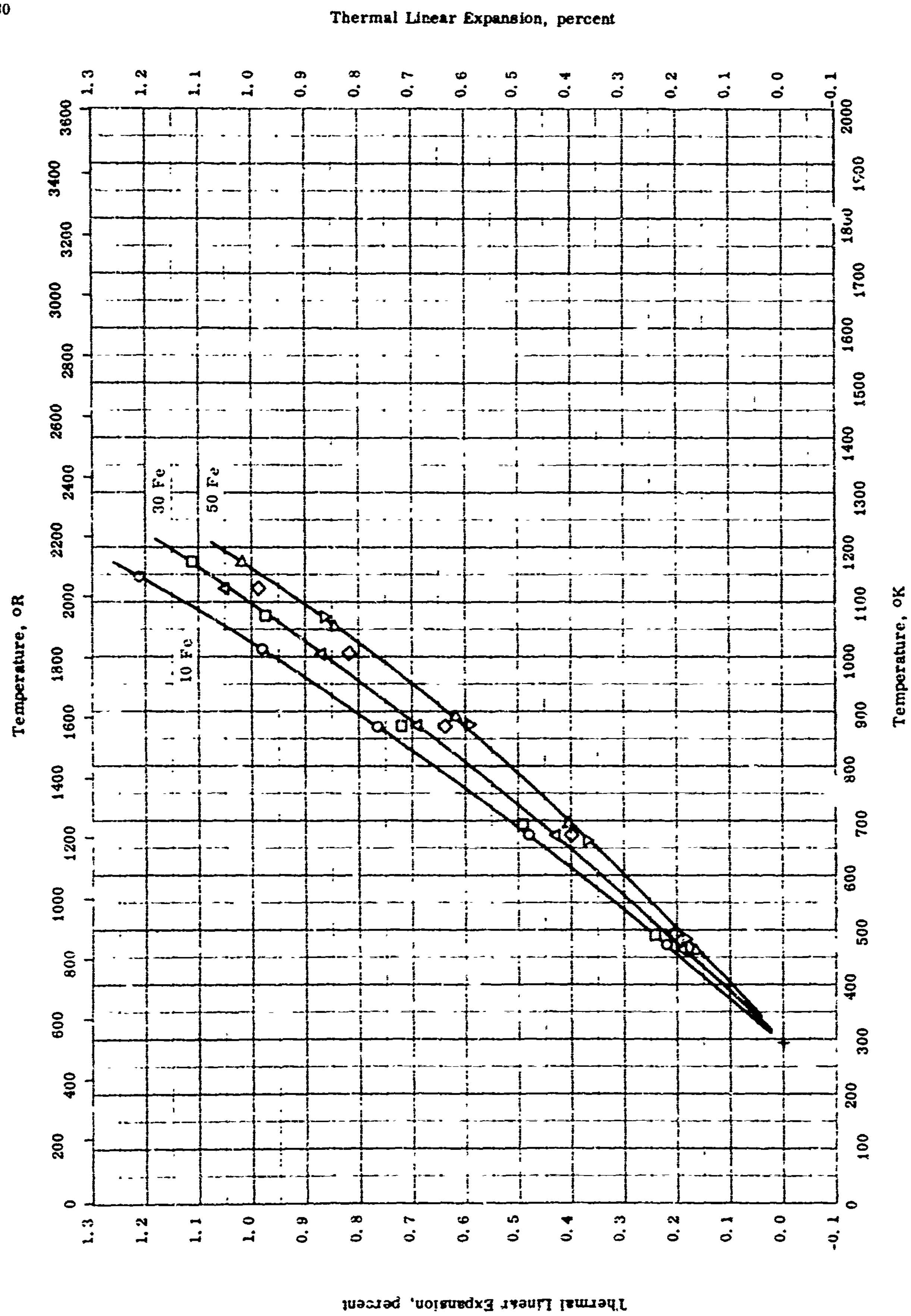


THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_i
(23.25 Fe and 21.0 Cr)

THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_i
(23.25 Fe and 21.0 Cr)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	51-16	293-1478		30.2 Co, 23.25 Fe, 21.0 Cr, 20.5 Ni, 2.43 Mo, 1.67 Mn, 0.17 C, and 0.119 N.	Heating rate: 200 F sec^{-1}.

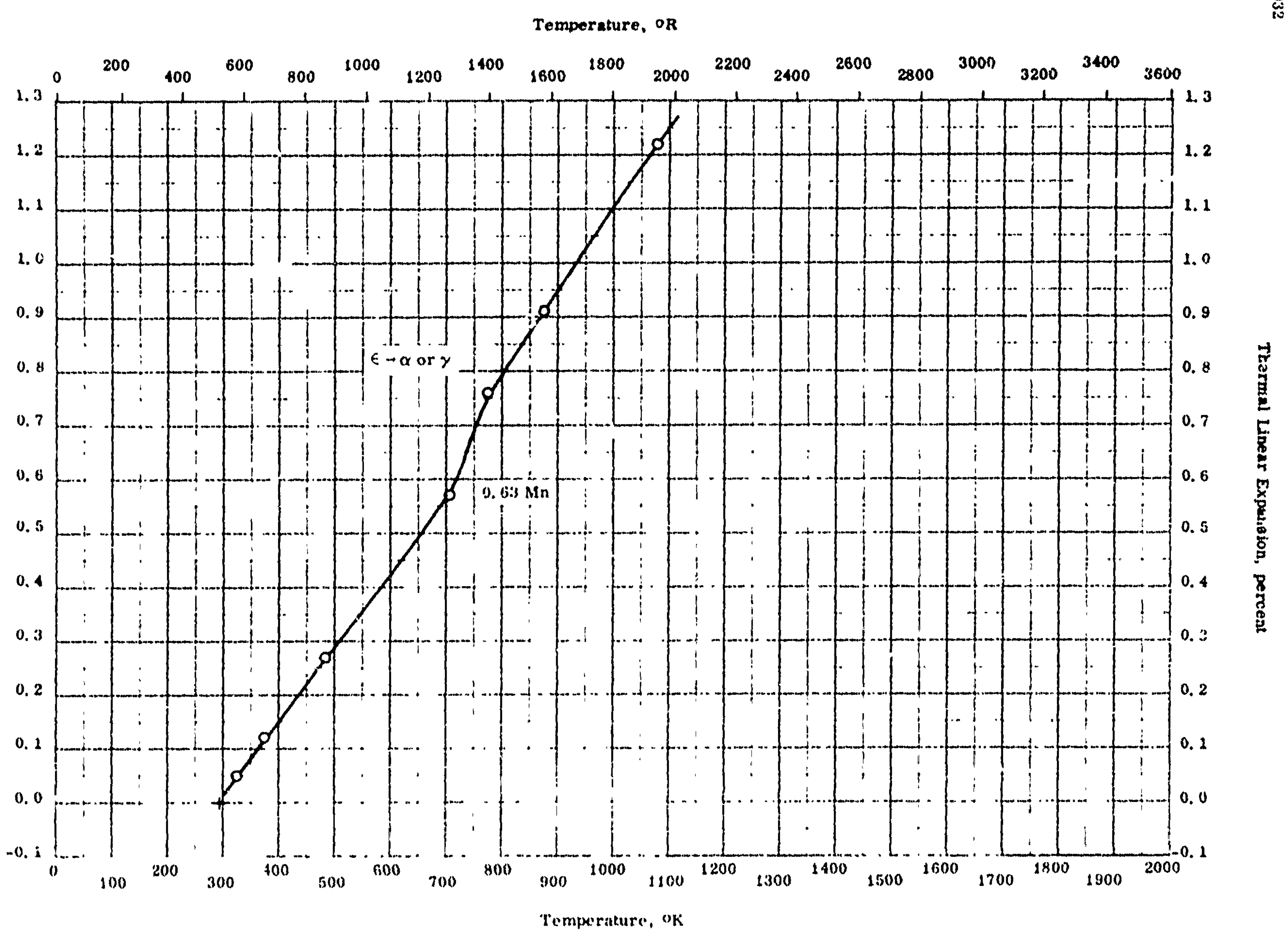


THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_1
($9 < Fe < 50$)

THERMAL LINEAR EXPANSION -- COBALT + IRON + ΣX_i
(9 < Fe < 50)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	48-9	373-1148		89.6 Co by diff., 9.6 Fe, 0.63 Mn, and 0.03 Si.	Induction melted in vacuum from Armco iron and cobalt rondelles, swaged, annealed 1 hr at 900 C in H_2 and cooled slowly; heating rate = 200 C hr^{-1}.
□	48-9	373-1173		79.4 Co, 20.2 Fe, 0.48 Mn, and 0.01 Si.	Same as above.
△	48-9	373-1123		69.6 Co, 29.8 Fe, 0.39 Mn, and 0.01 > Si.	Same as above.
◇	48-9	373-1123		59.8 Co, 39.4 Fe, 0.58 Mn, and 0.01 > Si.	Same as above.
▽	48-9	373-1073		52.1 Co, 47.89 Fe by diff. and 0.01 Ni.	Prepared from electrolytic Fe and Co; same heat treatment as above.
▷	48-9	373-1173		50.1 Co, 49.2 Fe, 0.47 Mn, and 0.01 > Si.	Prepared from Armco iron and cobalt rondelles; same heat treatment as above.

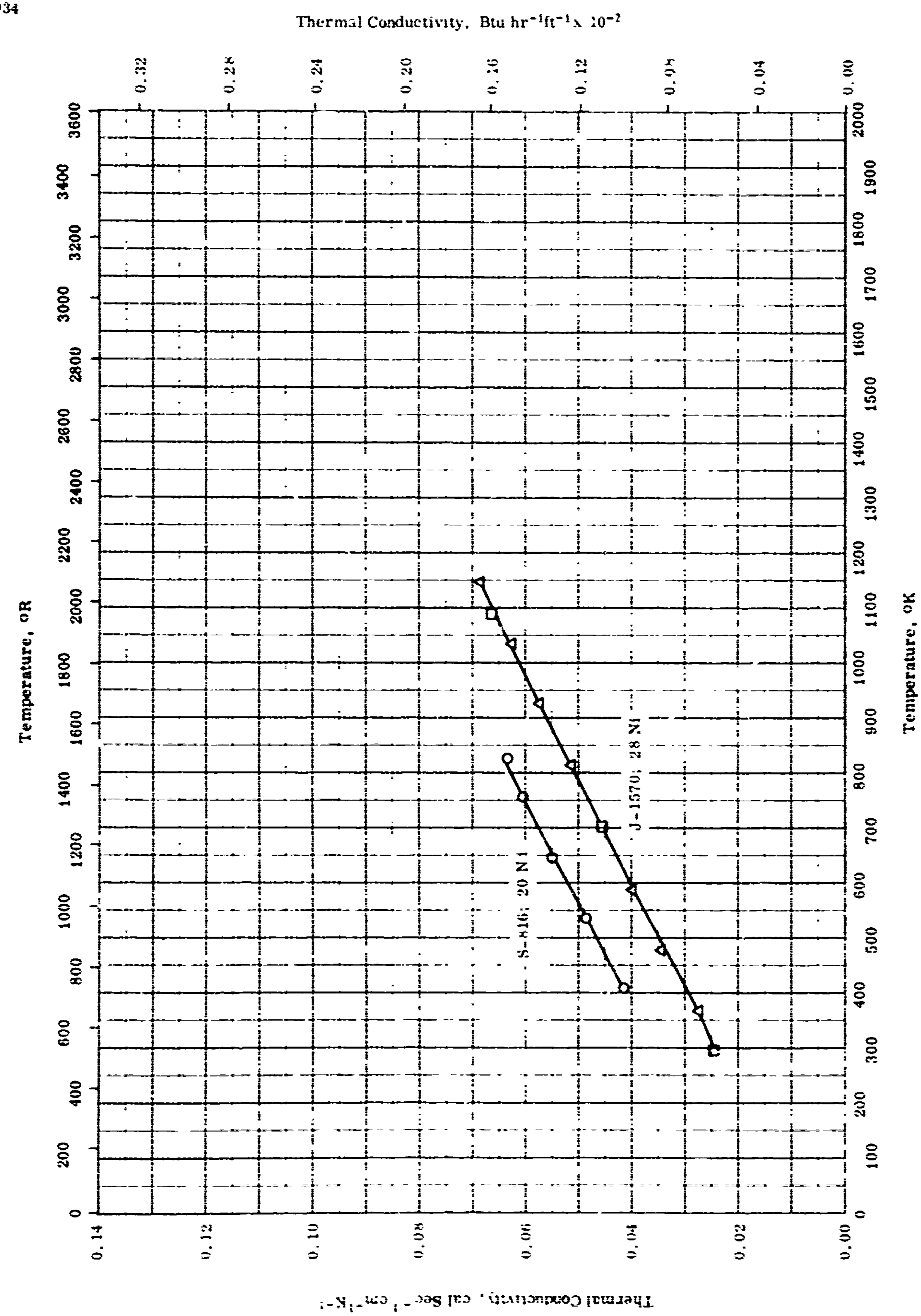


THERMAL LINEAR EXPANSION -- COBALT + MANGANESE + ΣX_i

THERMAL LINEAR EXPANSION -- COBALT + MANGANESE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	48-9	323-1073		98.9 Co (by diff.), 0.63 Mn, 0.2 C, 0.1 Fe, and 0.09 Si.	Induction melted in vacuum, swaged, annealed 1 hr at 900 C in hydrogen, and cooled slowly; prepared from Armco iron and cobalt rondelles.

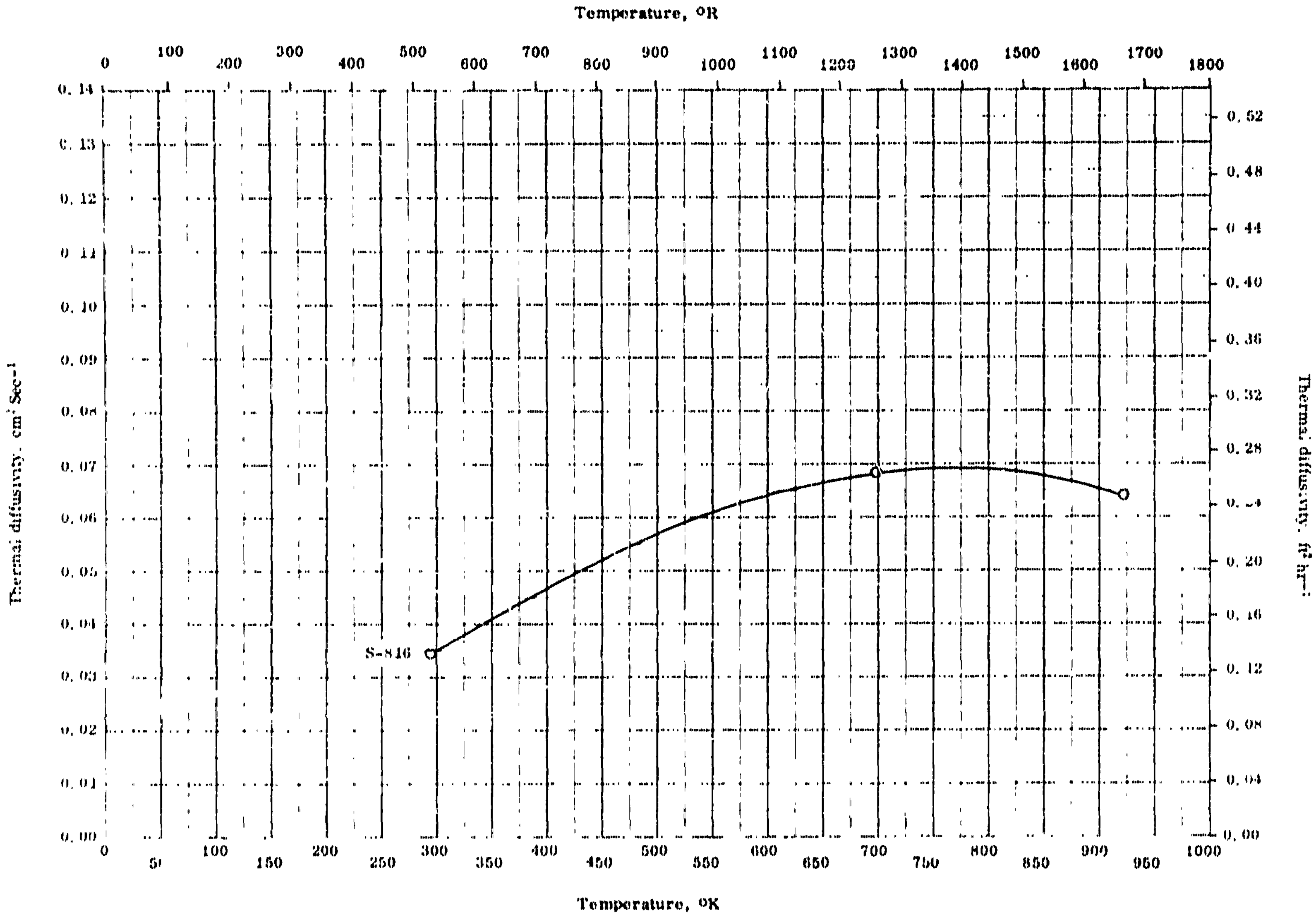


THERMAL CONDUCTIVITY -- COBALT + NICKEL + ΣX_i

THERMAL CONDUCTIVITY — COBALT + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-3	408-828	±4	S-816; 45.0 Co, 20.0 Ni, 20.0 Cr, and 15.0 Fe.	
□	57-10	294-1089		J-1570; 28 Ni, 20 Cr, 7 W, 4 Ti, 2 Fe, and 0.2 C.	
△	58-12	366-1144		J-1570; same as above.	

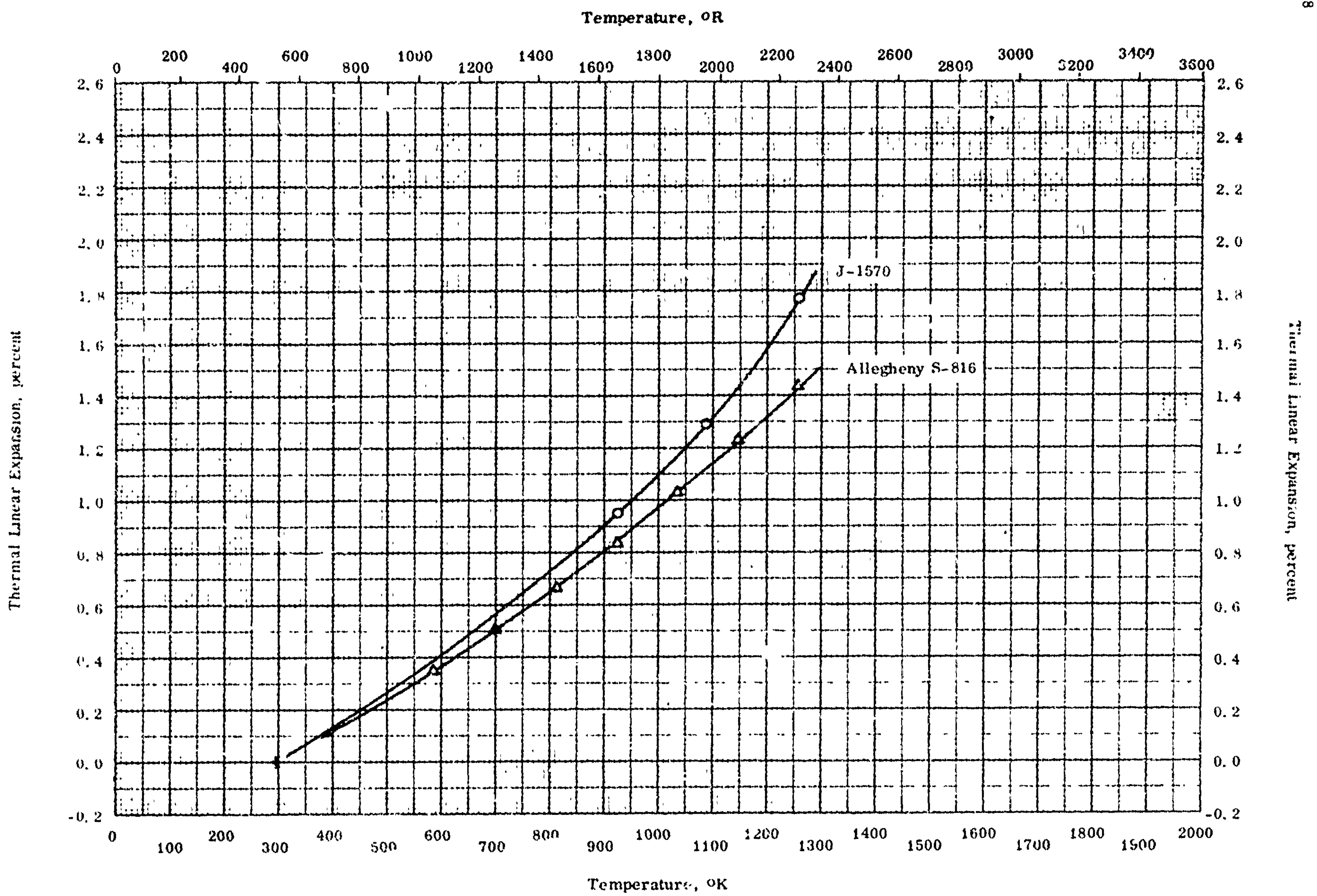


THERMAL DIFFUSIVITY -- COBALT + NICKEL + FX_1

THERMAL DIFFUSIVITY -- COBALT + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-2	294-922		S-816, 20 Ni, 20 Cr, 4.0 Fe, 4.0 Mo, 4.0 Nb, 4.0 W, 1.20 Mn, 0.4 Si, and 0.04 C; composition from Metal's Handbook.	



THERMAL LINEAR EXPANSION -- COBALT + NICKEL + ΣX_i

THERMAL LINEAR EXPANSION -- COBALT + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-43	294-1255		J-1570; nominal: 39 Co, 30 Ni, 20 Cr, 6.5 W, 4 Ti, and 0.2 C.	Solution-treated at 2150 F for 4 hrs, air-cooled, and then heat-treated at 1650 F for 24 hrs.
△	52-20	294-1255		Allegheny S-816; nominal: 40 - 44 Co, 19 - 21 Ni, 19 - 21 Cr, 5 max Fe, 3.5 - 5 W, 3.5 - 4.5 Mo, 3.5 - 4.5 Nb + Ta, 1.8 max Mn, 0.9 max Si, and 0.32 - 0.42 C; density 0.313 lb in.$^{-3}$ and M.P. 2350 - 2450 F.	

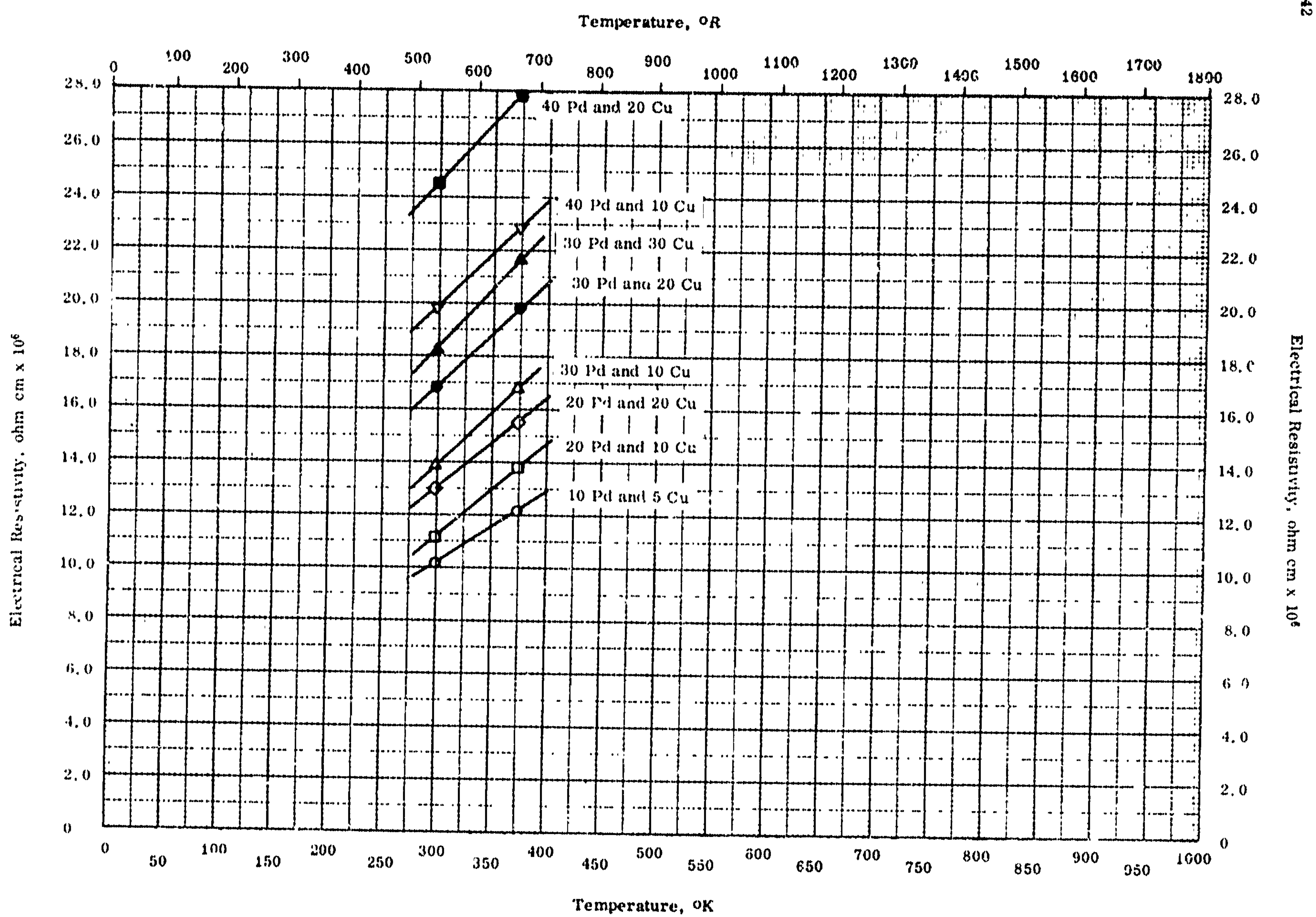
PROPERTIES OF COBALT - PALLADIUM - ΣX_i

REPORTED VALUES

Melting Point:	K	R
○ 40 Pd and 10 Cu	1426	2567
□ 30 Pd and 30 Cu	1418	2553
△ 10 Pd and 2 Au	1675	3015
▽ 10 Pd and 8.2 Au	1361	2450
◁ 20 Pd and 5.2 Au	1553	2796
▷ 20.1 Pd and 10.3 Au	1436	2585
◇ 30.2 Pd and 5.2 Au	1565	2817
● 30 Pd and 10 Au	1535	2763
■ 40.1 Pd and 5.3 Au	1531	2756
▲ 30 Pd and 20 Au	1466	2639
▼ 40.1 Pd and 10.2 Au	1514	2725
◀ 40.3 Pd and 15.2 Au	1493	2688
▶ 40.0 Pd and 20.0 Au	1463	2634
◆ 30 Pd and 30 Au	1463	2634

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1426		50 Co, 40 Pd, and 10 Cu.	M. P. from break in time-temperature curve.
□	56-24	1418		40 Co, 30 Pd, and 30 Cu.	Same as above.
△	56-25	1675		88 Co, 10 Pd, and 2.0 Au.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled; M. P. same as above.
▽	56-25	1361		81.8 Co, 10 Pd, and 8.2 Au.	Same as above.
◁	56-25	1553		74.8 Co, 20 Pd, and 5.2 Au.	Same as above.
▷	56-25	1436		69.6 Co, 20.1 Pd, and 10.3 Au.	Same as above.
◇	56-25	1565		64.6 Co, 30.2 Pd, and 5.2 Au.	Same as above.
●	56-25	1535		60 Co, 30 Pd, and 10 Au.	Same as above.
■	56-25	1531		54.6 Co, 40.1 Pd, and 5.3 Au.	Same as above.
▲	56-25	1466		50 Co, 30 Pd, and 20 Au.	Same as above.
▼	56-25	1514		49.7 Co, 40.1 Pd, and 10.2 Au.	Same as above.
◀	56-25	1493		44.5 Co, 40.3 Pd, and 15.2 Au.	Same as above.
▶	56-25	1463		40 Co, 40 Pd, and 20 Au.	Same as above.
◆	56-25	1463		40 Co, 30 Pd, and 30 Au.	Same as above.

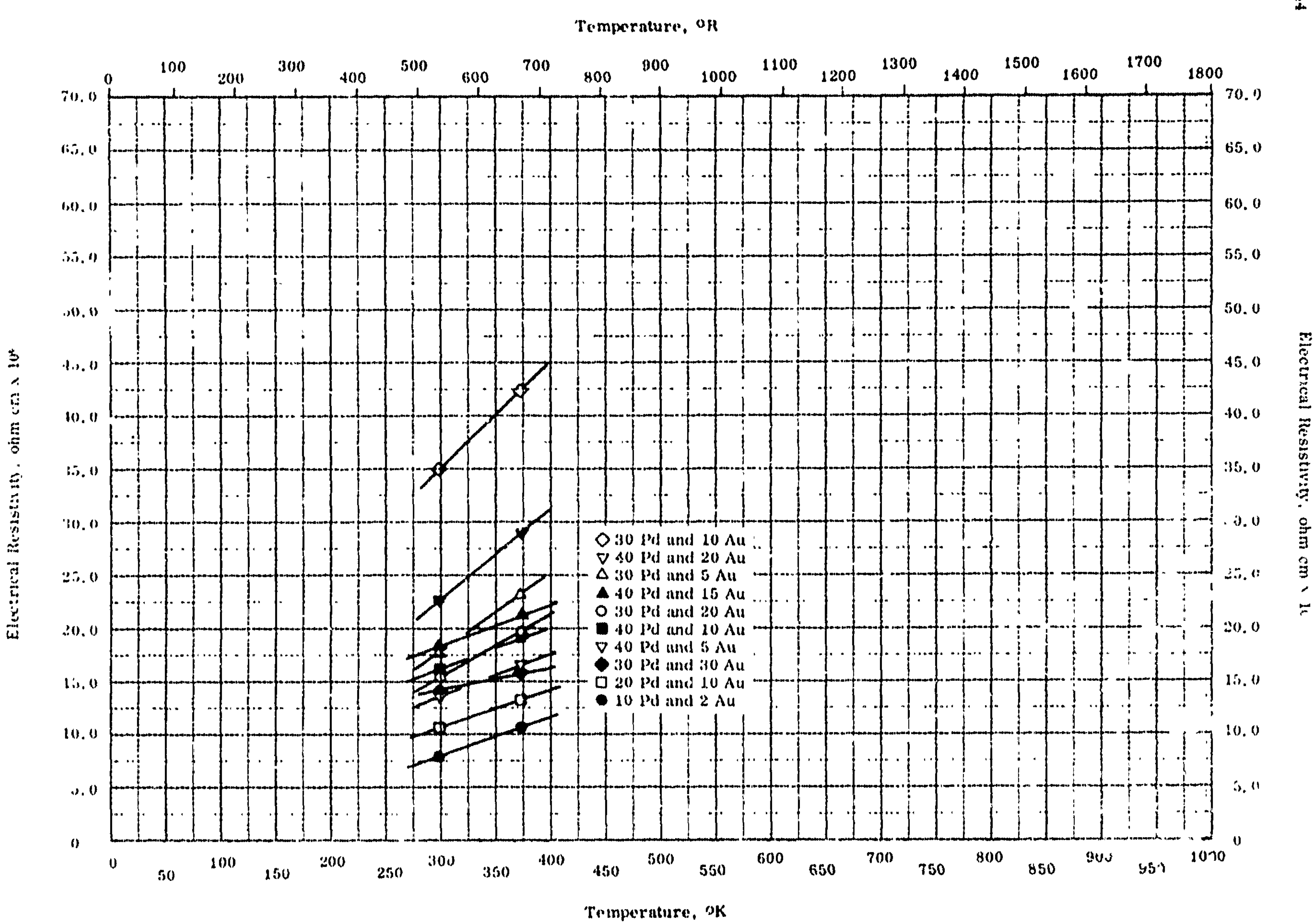


ELECTRICAL RESISTIVITY -- COBALT + PALLADIUM + ΣX_i
(10-30 Pd and 5-30 Cu)

ELECTRICAL RESISTIVITY -- COBALT + PALLADIUM + ΣX_i
(10-30 Pd and 5-30 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		85 Co, 10 Pd, and 5 Cu.	Annealed 150 hrs at 1000 C in vacuum; cooled in 10 hrs.
□	56-24	298-373		70 Co, 20 Pd, and 10 Cu.	Same as above.
△	56-24	298-373		60 Co, 30 Pd, and 10 Cu.	Same as above.
◇	56-24	298-373		60 Co, 20 Pd, and 20 Cu.	Same as above.
▽	56-24	298-373		50 Co, 40 Pd, and 10 Cu.	Same as above.
●	56-24	298-373		50 Co, 30 Pd, and 20 Cu.	Same as above.
■	56-24	298-373		40 Co, 40 Pd, and 20 Cu.	Same as above.
▲	56-24	298-373		40 Co, 30 Pd, and 30 Cu.	Same as above.

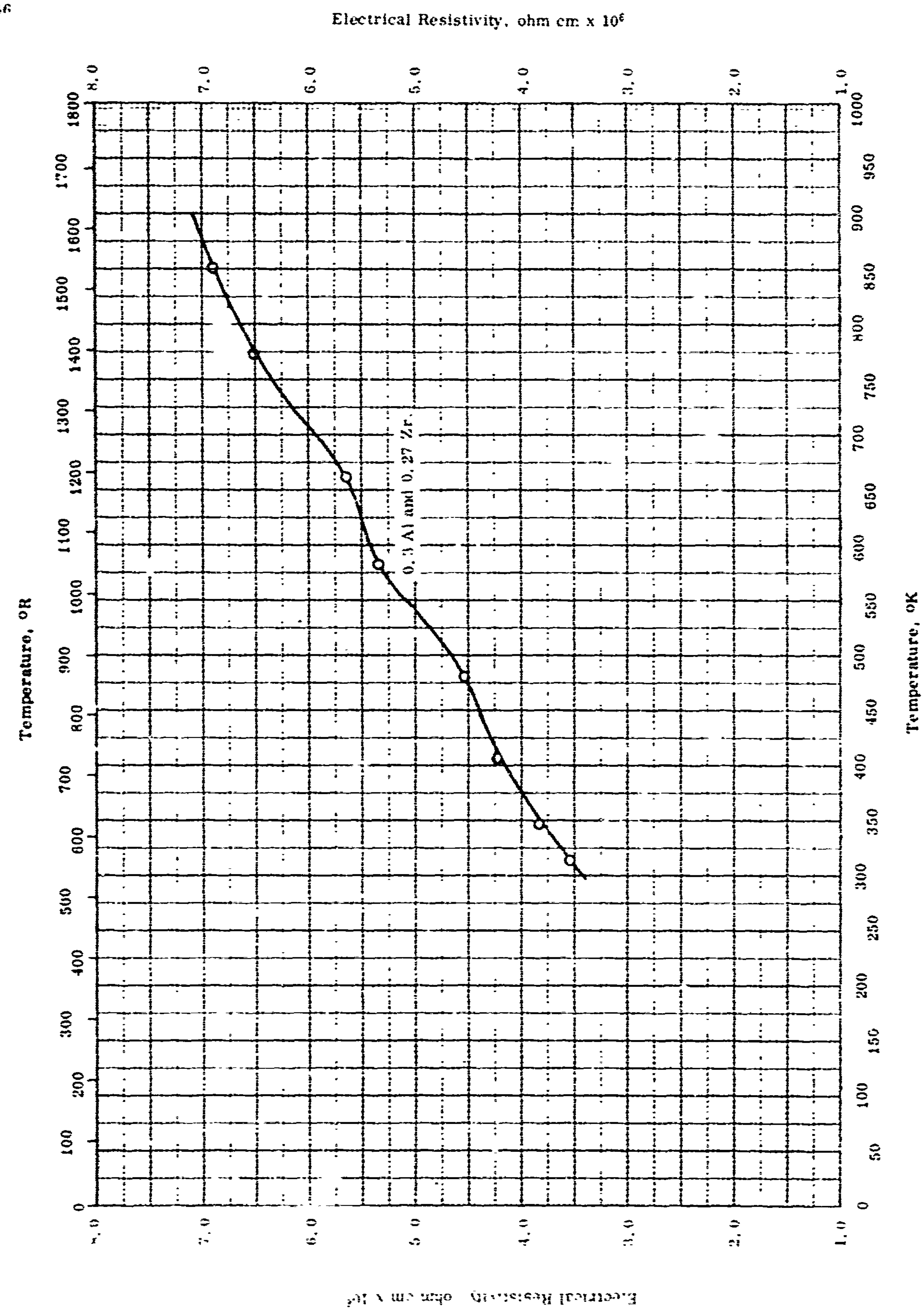


ELECTRICAL RESISTIVITY -- COBALT + PALLADIUM + ΣX_i
(10-40 Pd and 2-30 Au)

ELECTRICAL RESISTIVITY -- COBALT + PALLADIUM + ΣX_i
(10-40 Pd and 2-30 Au)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
●	56-25	298-373		88 Co, 10 Pd, and 2 Au.	Annealed 100-150 hrs close to solidus temperature in vacuum; cooled slowly to room temperature.
□	56-25	298-373		69.6 Co, 20.1 Pd, and 10.3 Au.	Same as above.
△	56-25	298-373		64.6 Co, 30.2 Pd, and 5.2 Au.	Same as above.
◇	56-25	298-373		60 Co, 30 Pd, and 10 Au.	Same as above.
▽	56-25	298-373		54.6 Co, 40.1 Pd, and 5.3 Au.	Same as above.
○	56-25	298-373		50 Co, 30 Pd, and 20 Au.	Same as above.
■	56-25	298-373		49.7 Co, 40.1 Pd, and 10.2 Au.	Same as above.
▲	56-25	298-373		44.5 Co, 40.3 Pd, and 15.2 Au.	Same as above.
▼	56-25	298-373		40 Co, 40 Pd, and 20 Au.	Same as above.
◆	56-25	298-373		40 Co, 30 Pd, and 30 Au.	Same as above.

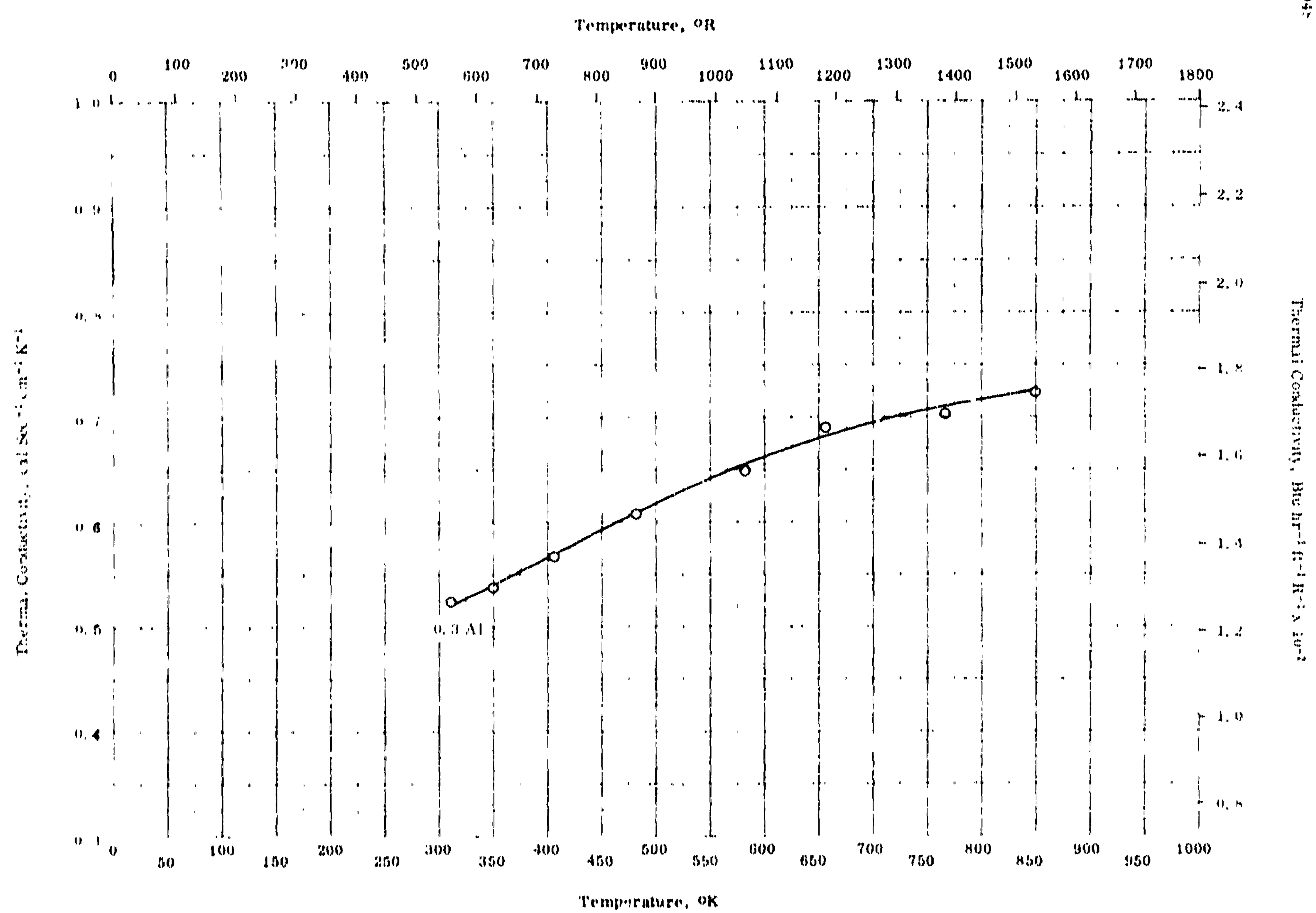


ELECTRICAL RESISTIVITY -- COPPER + ALUMINUM + ZX1

ELECTRICAL RESISTIVITY -- COPPER + ALUMINUM + ΣX_i

REFERENCE INFORMATION

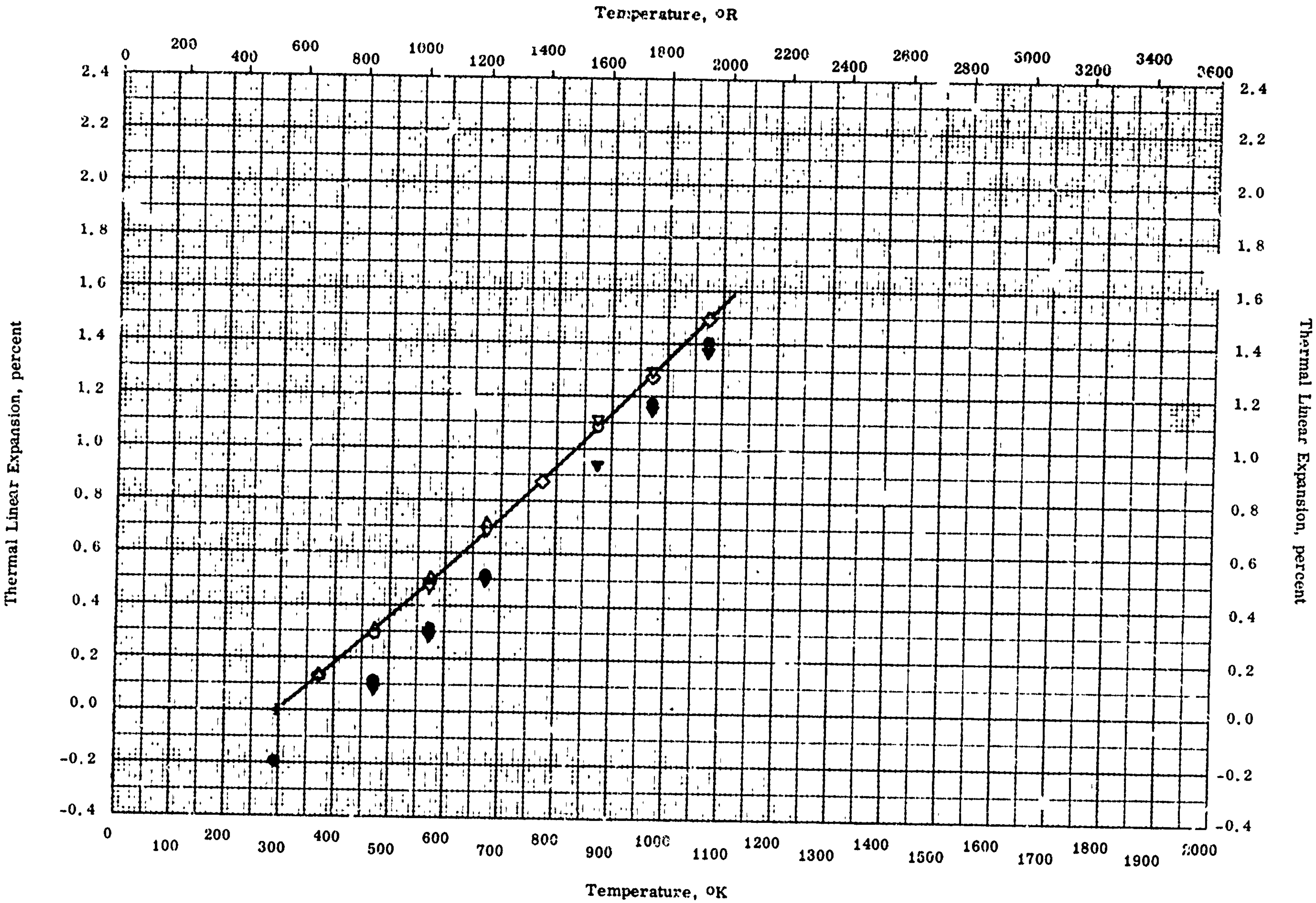
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	314-853		0.3 Al and 0.27 Zr.	Normalized.



THERMAL CONDUCTIVITY - COPPER - ALUMINUM - ΣX_i

REFERENCE INFORMATION

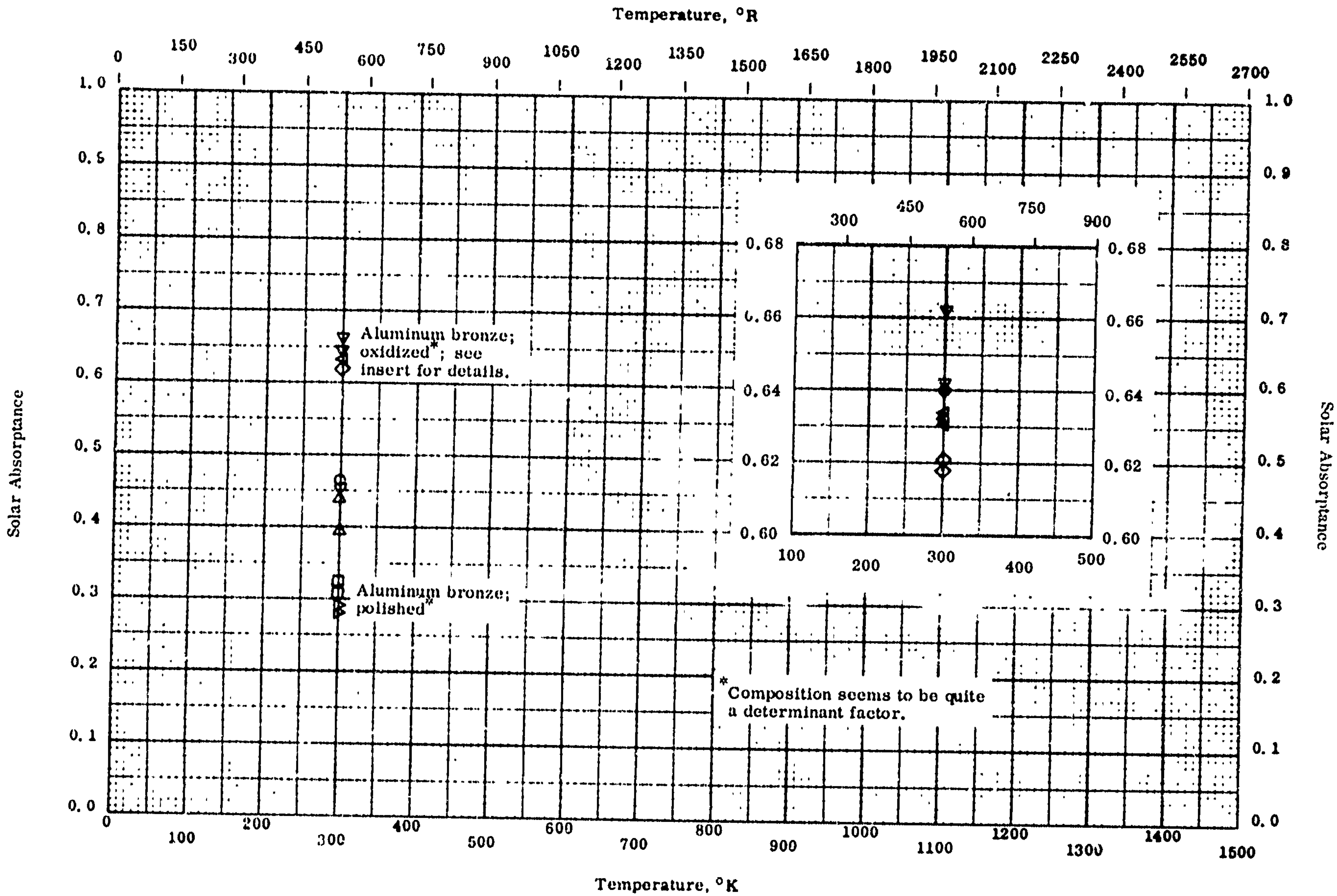
Symbol	Ref.	Temp. Range, °K	Rept. Error, %	Sample Specifications	Remarks
O	66	111-800		0.4 Al, 0.37 Zr	Normalized.



THERMAL LINEAR EXPANSION -- COPPER + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	47-6	293-673		Tc - Al Bronze; 88.13 Cu, 9.50 Al, 1.95 Fe, and 0.42 Te.	Extruded at approx 1550 F and aged at room temperature 18 to 40 months; plotted data show average (within 1%) for 2 samples; both heating and cooling.
◇	43-6	293-1073		Tempaloy 841; 89.67 Cu, 5.04 Al, 4.47 Ni, and 0.82 Si.	Average for 4 samples, cast at 1200 C and annealed; cast, annealed, and quenched; air-cooled.
▽	43-8	293-1073		Al Bronze; 89.71 Cu, 9.29 Al, 0.44 Fe, 0.38 Sn and 0.18 Ni.	Heating.
▼	43-8	293-1073		Same as above.	The above specimen, cooling.
○	43-8	293-1073		Al Bronze; 89.43 Cu, 9.30 Al, 0.58 Fe, 0.36 Ni, and 0.33 Sn.	Heating.
●	43-8	293-1073		Same as above.	The above specimen, cooling.

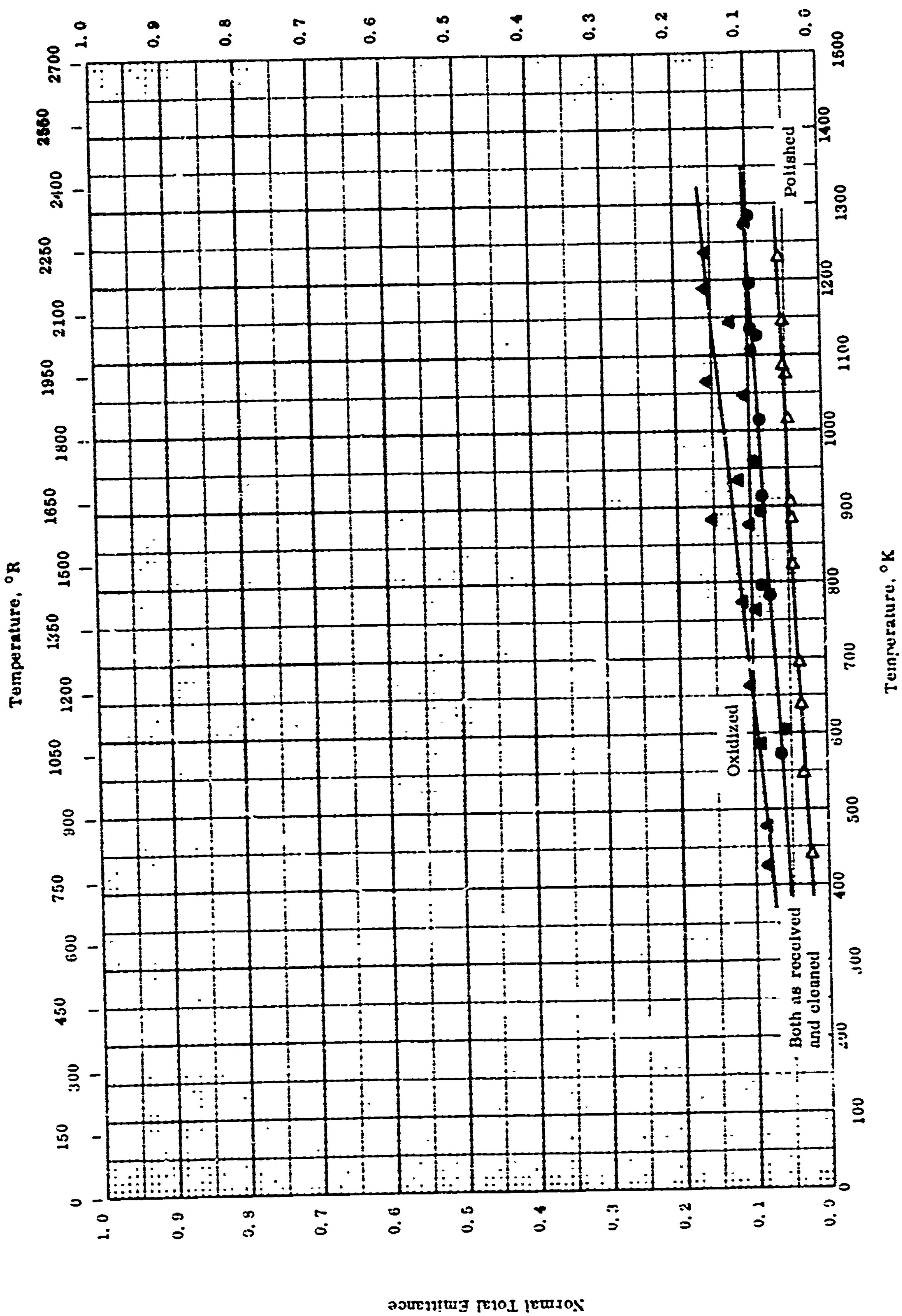


SOLAR ABSORPTANCE -- COPPER + ALUMINUM + ΣX_i

SOLAR ABSORPTANCE -- COPPER + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-48	298		Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	As received.
△	57-48	298		Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Cleaned with a liquid detergent.
□	57-48	298		Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Polished with fine polishing compounds on a buffing wheel.
▽	57-48	298		Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Oxidized in air at red heat for 30 min.
◇	57-48	298		Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	As received.
◁	57-48	298		Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	Cleaned with a liquid detergent.
▷	57-48	298		Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	Polished with fine polishing compounds on a buffing wheel.
◐	57-48	298		Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	Oxidized in air at red heat for 30 min.

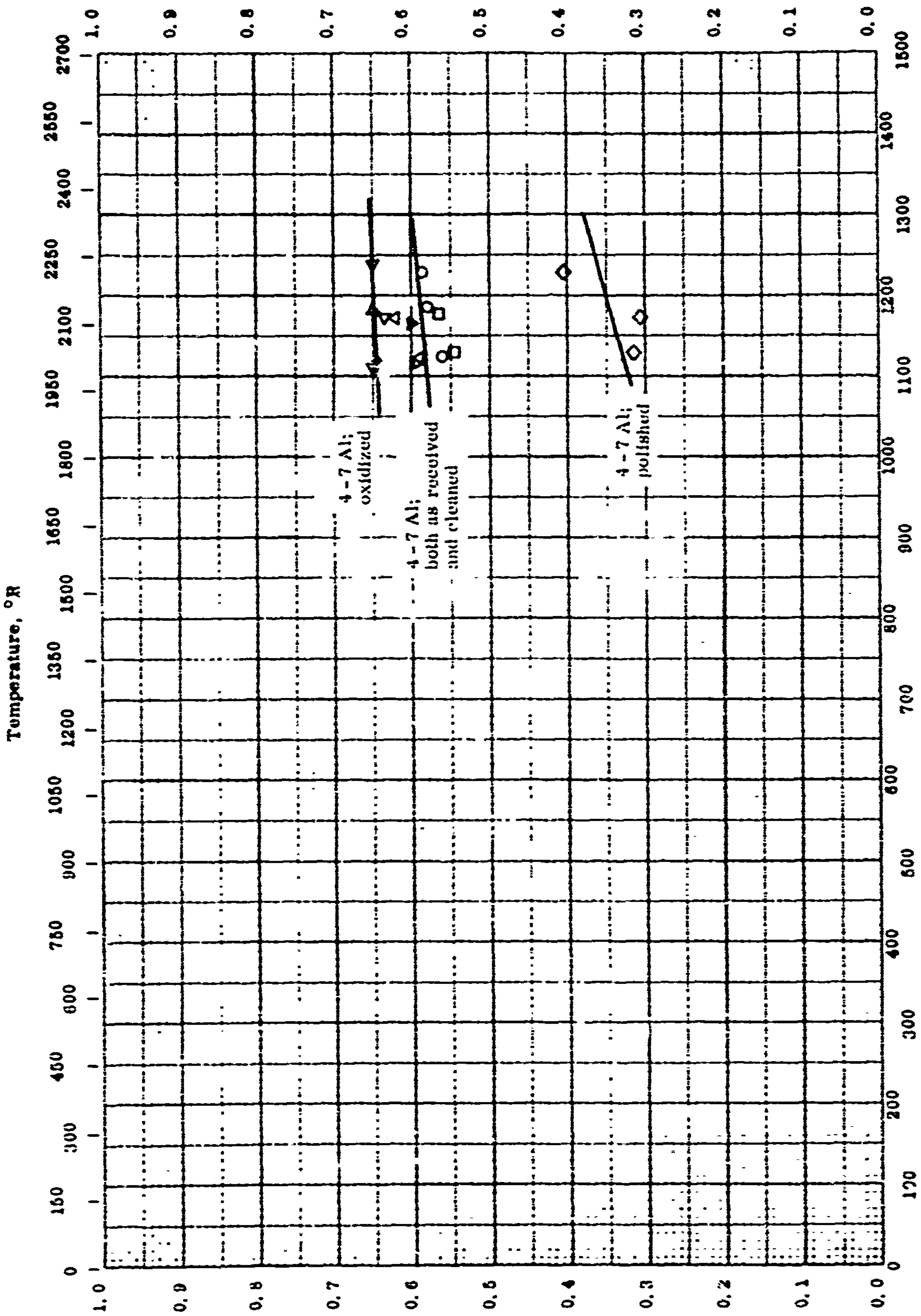


NORMAL TOTAL EMITTANCE -- COPPER + ALUMINUM + ΣX_i

NORMAL TOTAL EMITTANCE -- COPPER + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
●	57-48	573-1283	± 10	92 - 96 Cu, 4 - 7 Al, 0.5 max. Fe.	Measured in vacuum (5×10^{-4} mm Hg); same data for as received and cleaned (with a liquid detergent).
▷	57-48	440-1228	± 10	92 - 96 Cu, 4 - 7 Al, 0.5 max. Fe.	Polished with fine polishing compounds on a buffing wheel; measured in vacuum (5×10^{-4} mm Hg).
▲	57-48	422-1233	± 10	92 - 96 Cu, 4 - 7 Al, 0.5 max. Fe.	Oxidized in air at red heat for 30 min.; measured in vacuum (5×10^{-4} mm Hg).

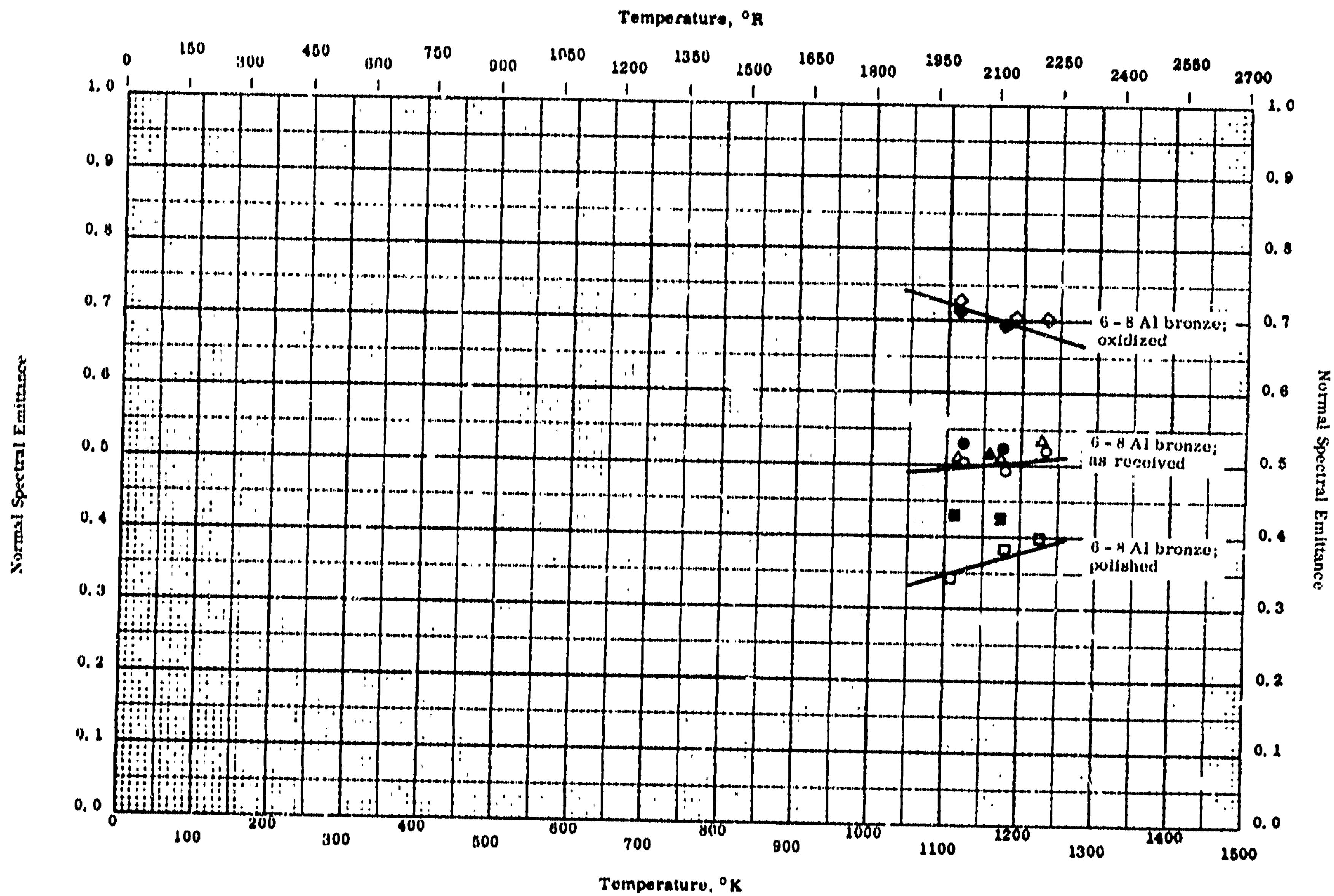


NORMAL SPECTRAL EMITTANCE — COPPER + ALUMINUM + ΣXi
(4-7 Aluminum Bronze)

NORMAL SPECTRAL EMITTANCE -- COPPER + ALUMINUM + ΣX$_i$
(4 - 7 Aluminum Bronze)

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error%	Sample Specifications	Remarks
○	57-48	0.665	1126-1228	± 10	92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	As received; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
△	57-48	0.665	1122-1172	± 10	Same as above.	Same as above; first cycle cooling.
□	57-48	0.665	1130-1228	± 10	Same as above.	Cleaned with liquid detergent; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
▽	57-48	0.665	1119-1166	± 10	Same as above.	Same as above; first cycle cooling.
◇	57-48	0.665	1128-1228	± 10	Same as above.	Polished with fine polishing compounds on a buffing wheel; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
◁	57-48	0.665	1111-1223	± 10	Same as above.	Oxidized in air at red heat for 30 min; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
▷	57-48	0.665	1116-1182	± 10	Same as above.	Same as above; first cycle cooling.

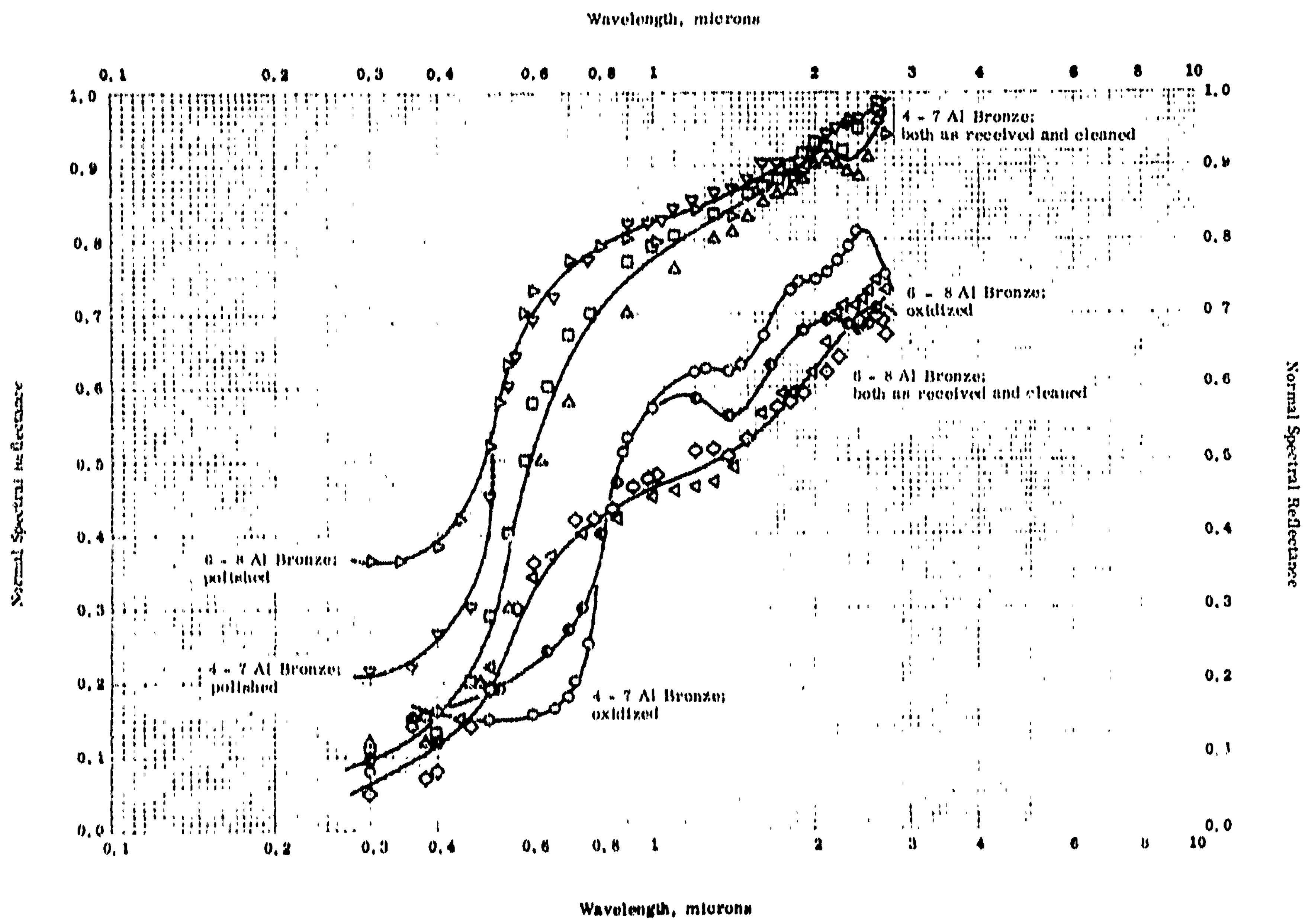


NORMAL SPECTRAL EMITTANCE -- COPPER + ALUMINUM + ΣX_i
(6 - 8 Aluminum Bronze)

NORMAL SPECTRAL EMITTANCE -- COPPER + ALUMINUM + ΣX_i
(6 - 8 Aluminum Bronze)

REFERENCE INFORMATION

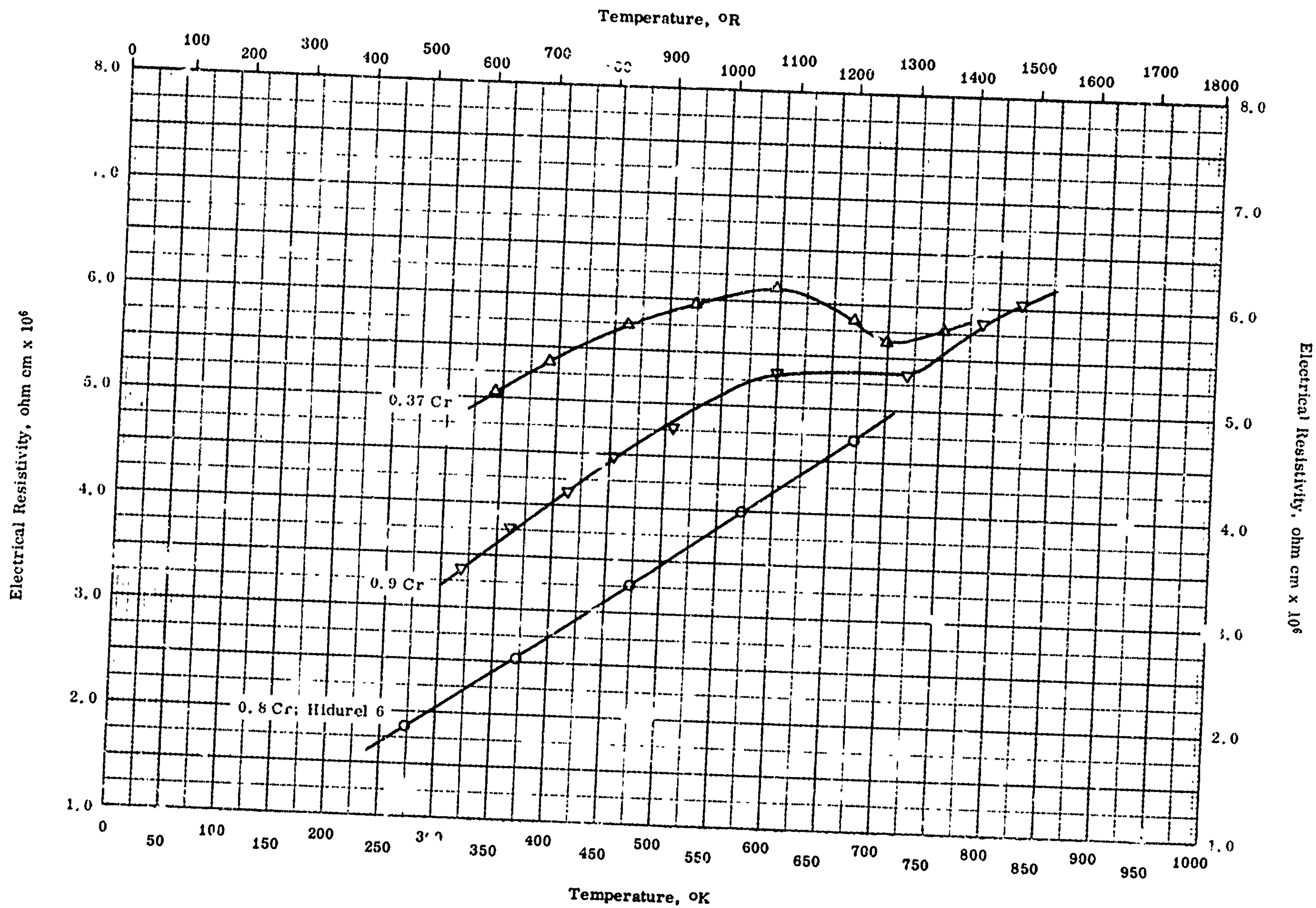
Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error%	Sample Specifications	Remarks
○	57-48	0.665	1122-1233		Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	As received; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
●	57-48	0.665	1122-1178		Same as above.	Same as above; first cycle cooling.
△	57-48	0.665	1116-1227		Same as above.	Cleaned with a liquid detergent; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
▲	57-48	0.665	1116-1157		Same as above.	Same as above; first cycle cooling.
□	57-48	0.665	1108-1225		Same as above.	Polished with fine polishing compound on a buffing wheel; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
■	57-48	0.665	1112-1172		Same as above.	Same as above; first cycle cooling.
◇	57-48	0.665	1114-1233		Same as above.	Oxidized in air at red heat for 30 min; measured in vacuum of 5×10^{-4} mm Hg; first cycle heating.
◆	57-48	0.665	1118-1178		Same as above.	Same as above; first cycle cooling.



NORMAL SPECTRAL REFLECTANCE -- COPPER + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	57-48	298	0.3-2.7	±4	Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Oxidized in air at red heat for 30 min.; data taken from smooth curve.
△	57-48	298	0.3-2.6	±4	Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	As received; data taken from smooth curve.
□	57-48	298	0.3-2.6	±4	Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Cleaned with a liquid detergent; data taken from smooth curve.
▽	57-48	298	0.3-2.6	±4	Aluminum bronze; 92 - 96 Cu, 4 - 7 Al, and 0.5 max. Fe.	Polished with fine polishing compounds on a buffing wheel; data taken from smooth curve.
◇	57-48	298	0.3-2.7	±4	Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	As received; data taken from smooth curve.
◁	57-48	298	0.3-2.7	±4	Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, 3.5 max. Fe, and 1 max. Mn.	Cleaned with a liquid detergent; data taken from smooth curve.
▷	57-48	298	0.3-2.7	±4	Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, and 1 max. Mn.	Polished with fine polishing compounds on a buffing wheel; data taken from smooth curve.
●	57-48	298	0.3-2.7	±4	Aluminum bronze; 88 - 92.5 Cu, 6 - 8 Al, 3.5 max. Fe, 3.5 max. Fe, and 1 max. Mn.	Oxidized in air at red heat for 30 min.; data taken from smooth curve.

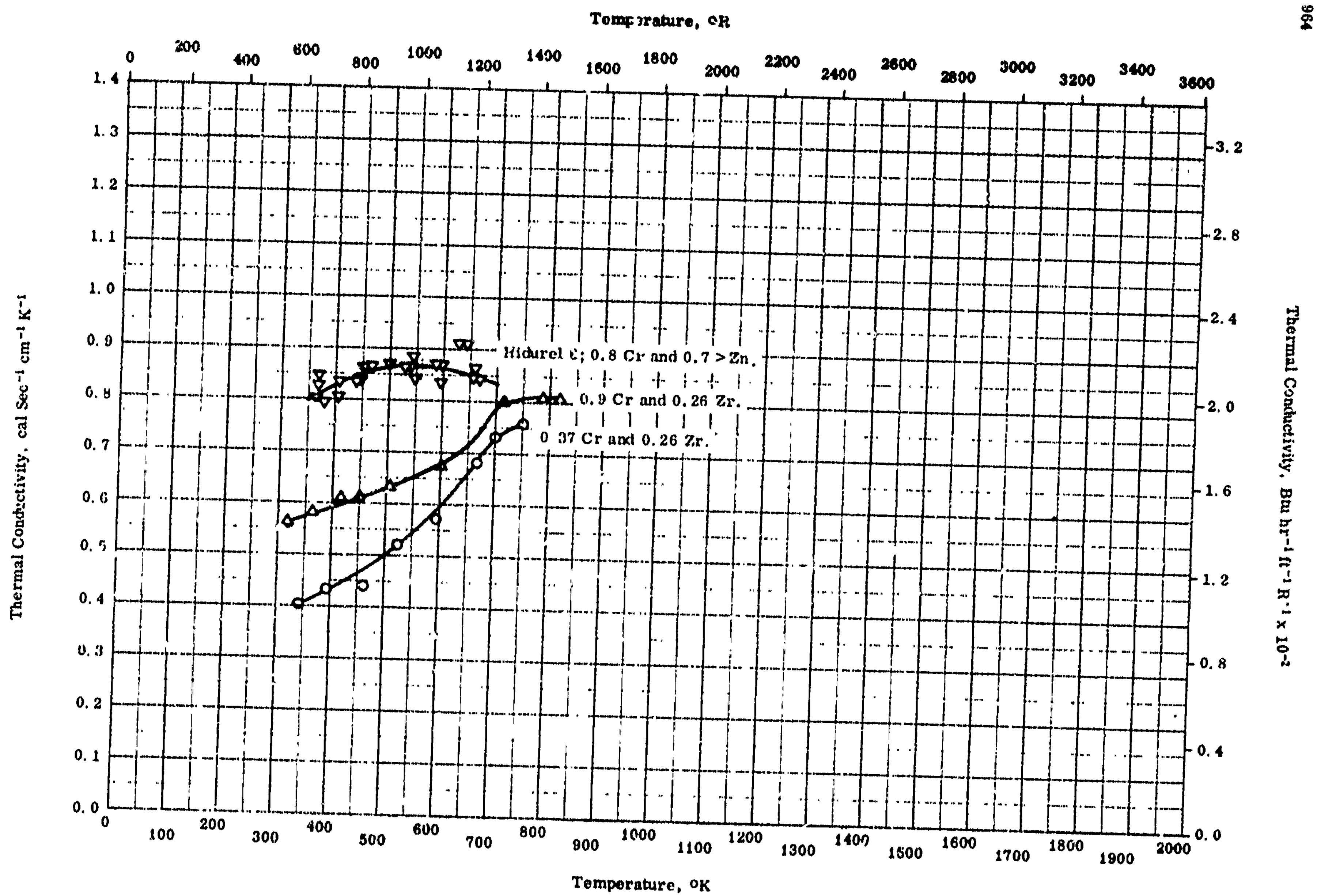


ELECTRICAL RESISTIVITY -- COPPER + CHROMIUM + ΣX_i

ELECTRICAL RESISTIVITY -- COPPER + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	56-6	343-751		0.37 Cr, and 0.25 - 0.28 Zr.	Normalized.
▽	56-6	316-821		0.9 Cr and 0.25 - 0.28 Zr.	Same as above.
○	64-2	273-673		Hidurel 6; 0.8 Cr, 0.7 > Zn, 0.05 > Pb, 0.03 Ni, 0.02 Fe, 0.01 > Si, and Al, Mn, and Sn not detected.	Hot-rolled; solution-treated to insure max solution of Cr, followed by water quenching; aged at 500 C followed by air cooling.



THERMAL CONDUCTIVITY -- COPPER + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	343-751		0.37 Cr, 0.25-0.28 Zr.	Normalized.
△	56-6	316-821		0.9 Cr, 0.25-0.28 Zr.	Normalized.
▽	64-2	364-667	± 5	Hiklurel 6; average chemical analysis 0.8 Cr; spectrographic analysis: 0.7 > Zn, 0.05 > Pb, 0.03 Ni, 0.02 Fe, and 0.01 > Si.	Hot rolled bar; solution treated at a temperature sufficient to ensure max. solution of Cr, water-quenched, and then aging at 500 C followed by air cooling.

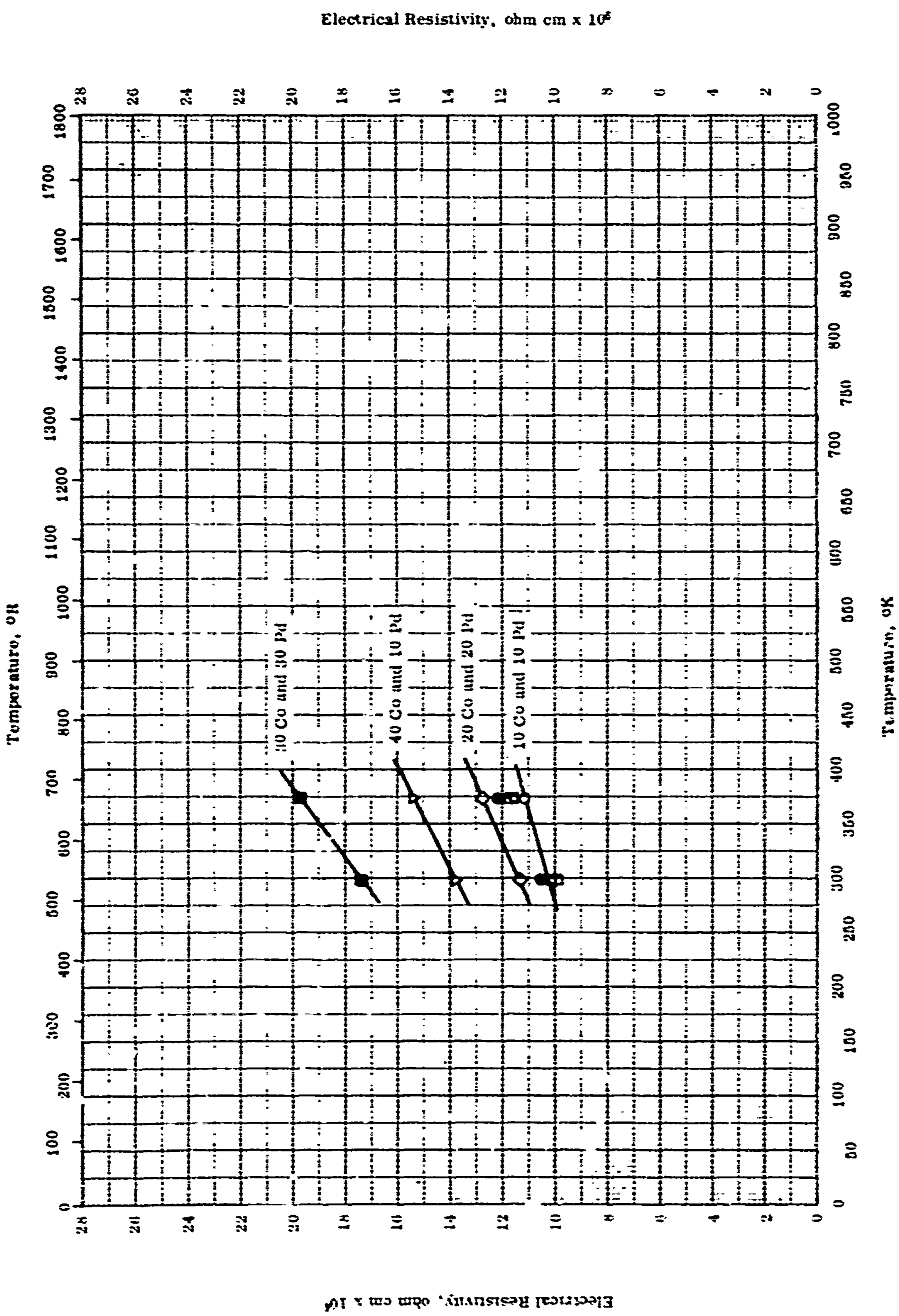
PROPERTIES OF COPPER + COBALT + ΣX_i

REPORTED VALUES

Melting Point:	K	R
○ 20 Co and 10 Pd	1340	2413
□ 30 Co and 10 Pd	1356	2441
△ 30 Co and 20 Pd	1396	2513
▽ 40 Co and 20 Pd	1415	2548
◇ 30 Co and 30 Pd	1403	2526

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1340		70 Cu, 20 Co, and 10 Pd; from electrolytic Cu and Co with 0.01 % C.	M.P. from break in time-temperature curve.
□	56-24	1356		30 Co and 10 Pd; same as above.	Same as above.
△	56-24	1396		30 Co and 20 Pd; same as above.	Same as above.
▽	56-24	1415		40 Co and 20 Pd; same as above.	Same as above.
◇	56-24	1403		30 Co and 30 Pd; same as above.	Same as above.

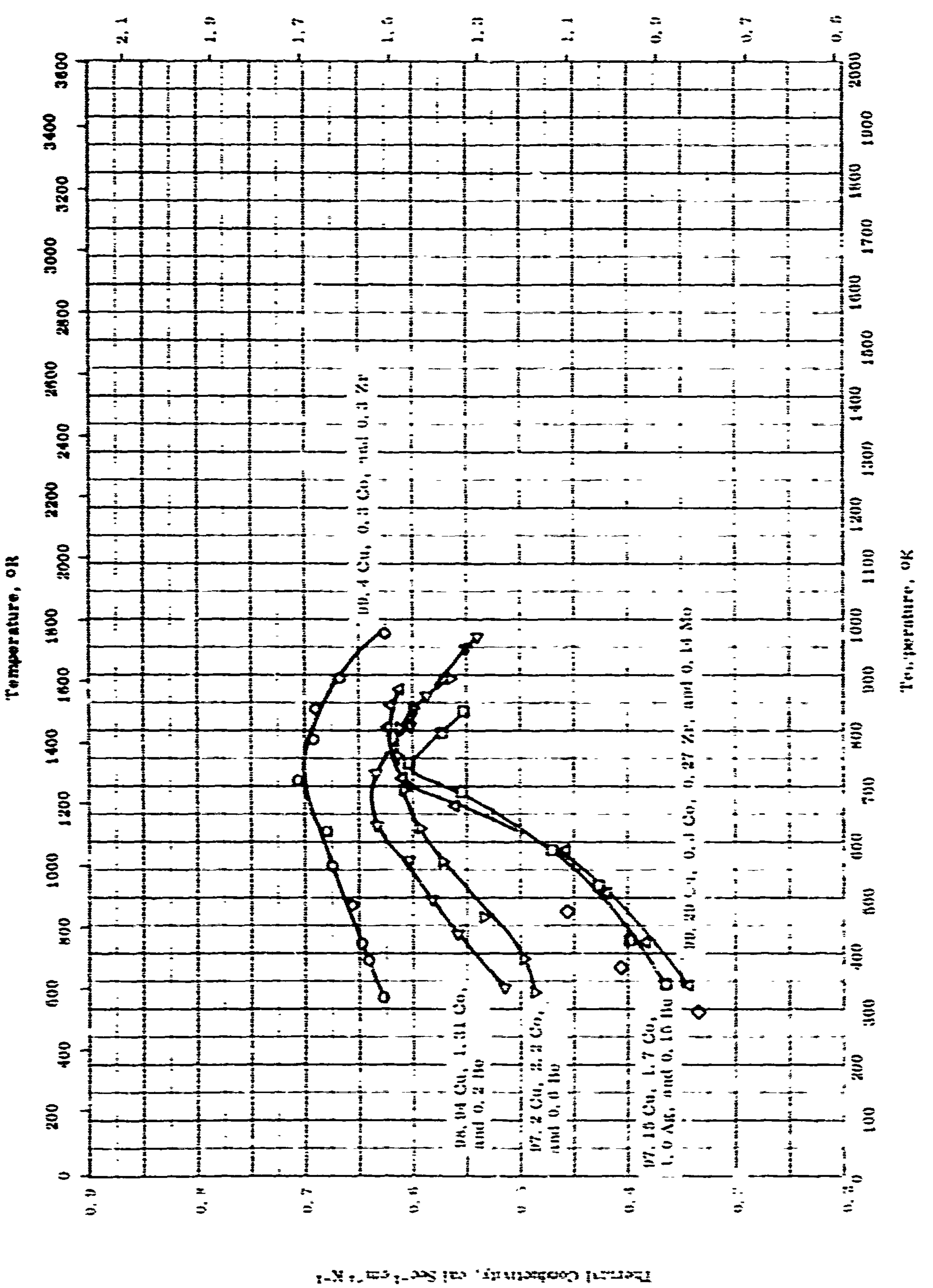


ELECTRICAL RESISTIVITY -- COPPER + COBALT + ΣX_i

ELECTRICAL RESISTIVITY -- COPPER + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		80 Cu, 10 Co and 10 Pd.	Annealed 150 hrs at 1000 C in vacuum and cooled in 10 hrs.
□	56-24	298-373		70 Cu, 20 Co and 10 Pd.	Same as above.
△	56-24	298-373		60 Cu, 30 Co and 10 Pd.	Same as above.
◇	56-24	298-373		60 Cu, 20 Co and 20 Pd.	Same as above.
▽	56-24	298-373		50 Cu, 40 Co and 10 Pd.	Same as above.
●	56-24	298-373		40 Cu, 40 Co and 20 Pd.	Same as above.
■	56-24	298-373		40 Cu, 30 Co and 30 Pd.	Same as above.

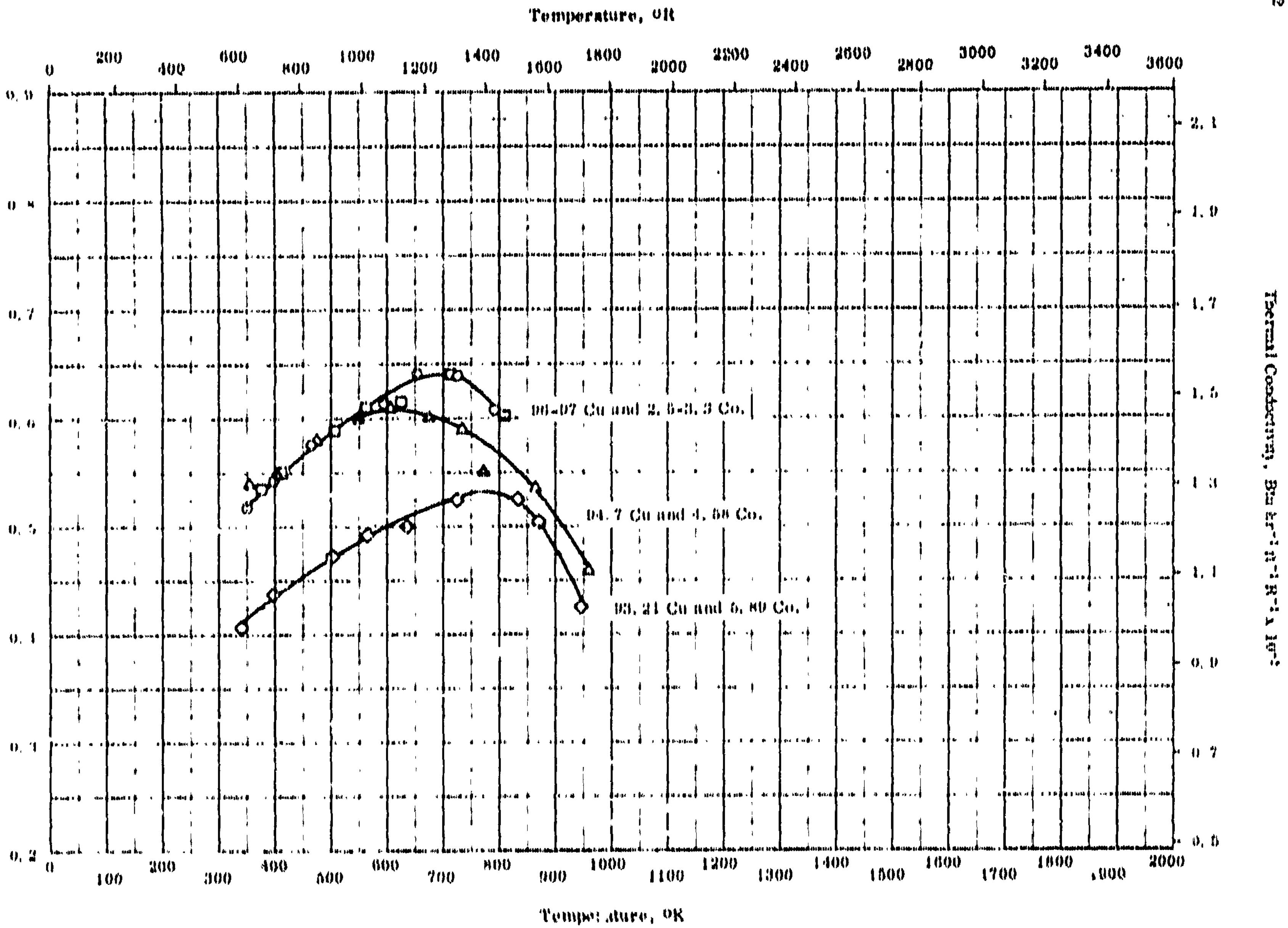


THERMAL CONDUCTIVITY -- COPPER + COBALT + ΣXi
(0.3 - 2.2 Co)

THERMAL CONDUCTIVITY -- COPPER + COBALT + ΣX_i
(0.3 - 2.2 Co)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, °K	Repl. Error %	Sample Specifications	Remarks
○	57-2	321-975		99.4 Cu, 0.3 Co, and 0.3 Zr.	
□	57-2	342-836		97.15 Cu, 1.7 Co, 1.0 Ag, 0.15 Be.	
△	57-2	341-873		99.29 Cu, 0.30 Co, 0.27 Zr, and 0.14 Mo.	
▽	57-2	330-802		97.2 Cu, 2.2 Co, and 0.6 Be.	
◁	59-1	338-968		98.49 Cu, 1.31 Co, and 0.2 Be.	
◇	60-3	293-473		97.3 Cu, 2.2 Co, and 0.5 Be.	Normalized at 1000 C for 30 min.

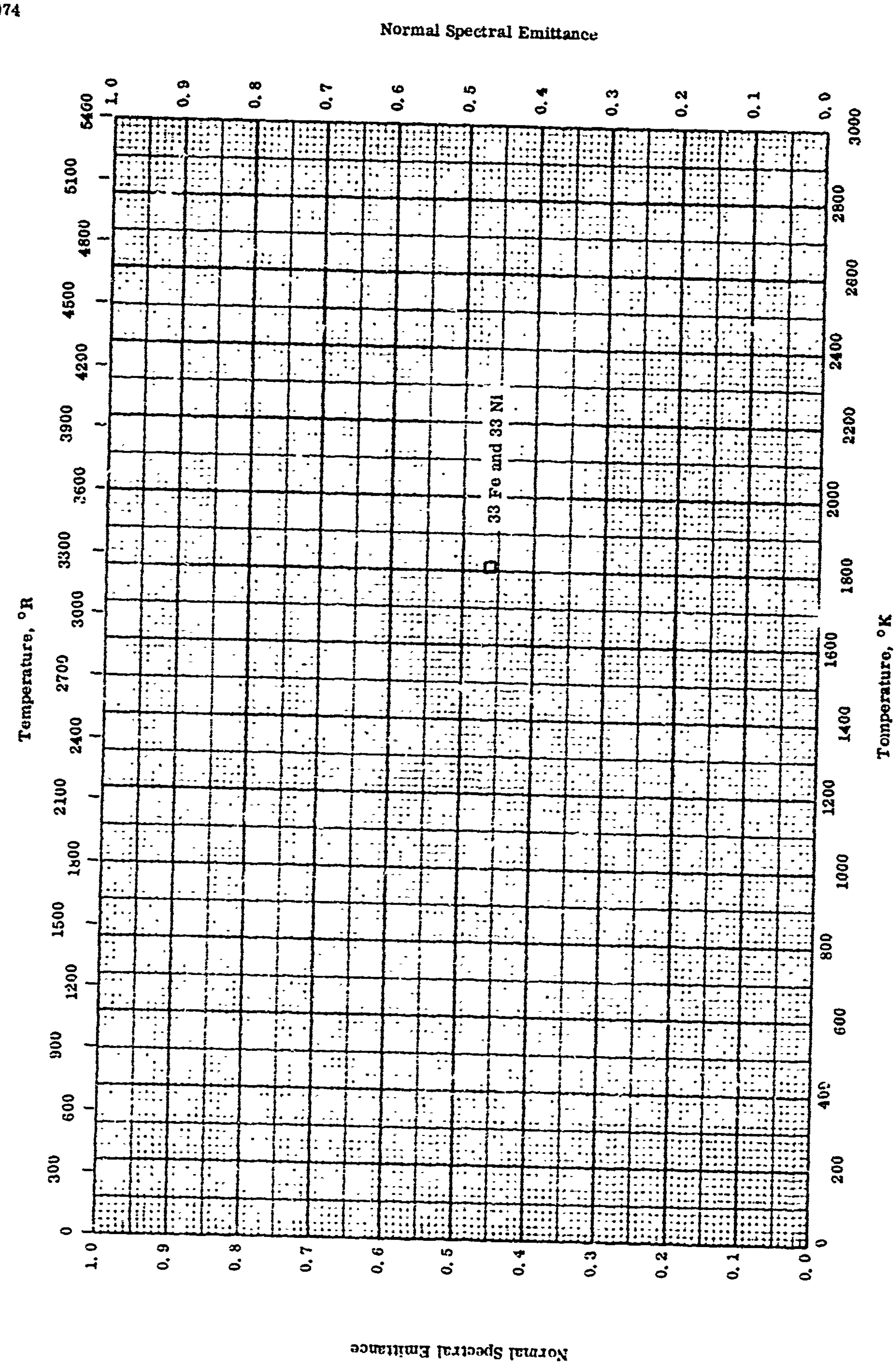


THERMAL CONDUCTIVITY -- COPPER + COBALT + ΣXi
(2.5-6.0 Co)

THERMAL CONDUCTIVITY -- COPPER + COBALT + ΣX_i
(2.5 - 6.0 Co)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-1	360-704		97.08 Cu, 2.52 Co, and 0.4 Be.	
□	59-1	376-810		96.23 Cu, 3.27 Co, and 0.5 Be.	
△	59-1	366-900		94.72 Cu, 4.58 Co, and 0.7 Be.	
◇	59-1	340-947		93.21 Cu, 5.89 Co, and 0.9 Be.	

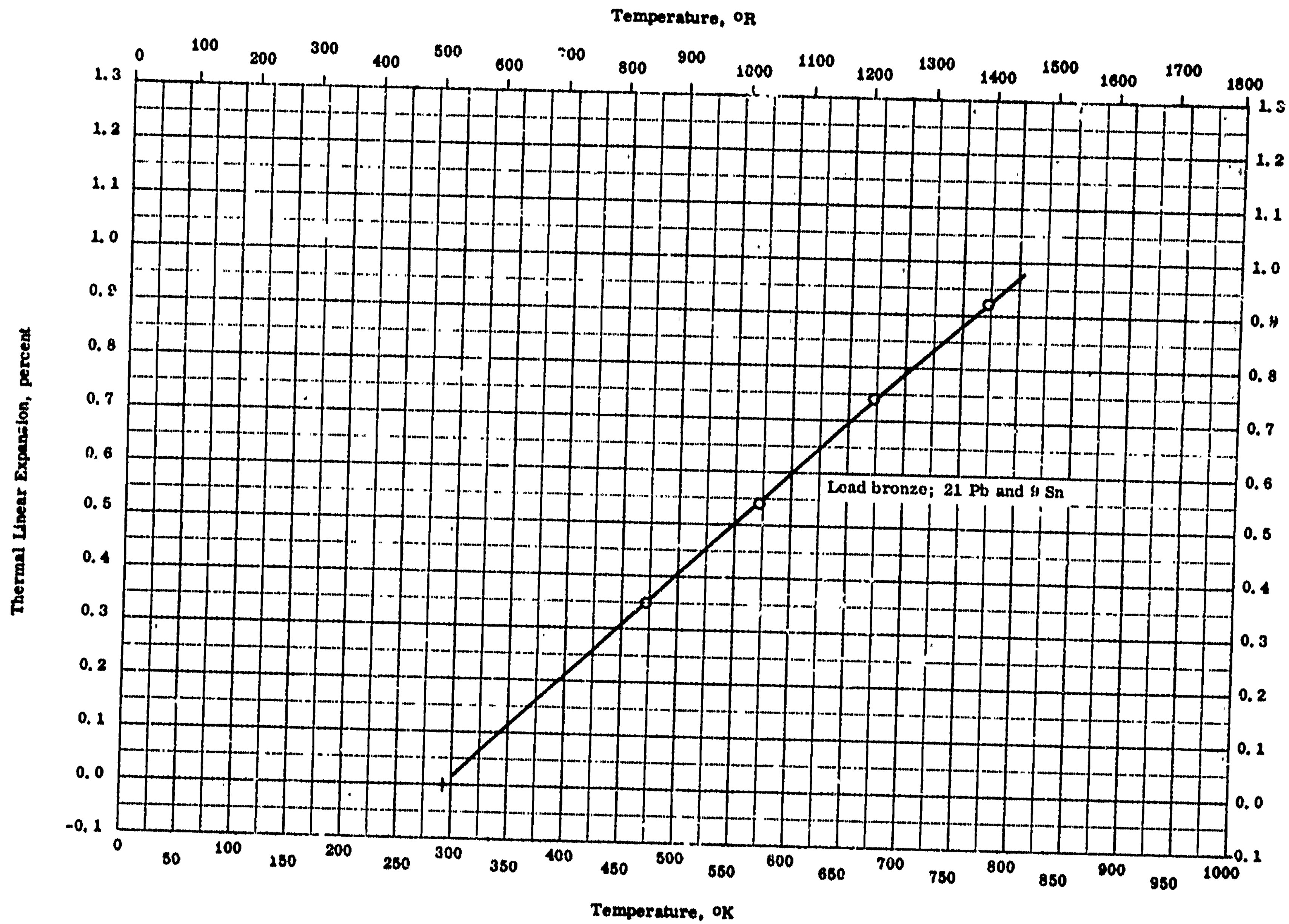


NORMAL SPECTRAL EMITTANCE -- COPPER + IRON + ΣX_i

NORMAL SPECTRAL EMITTANCE -- COPPER + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	52-16	0.65	1808		33.33 Cu, 33.33 Fe, and 33.33 Ni.	Measured in 50 - 50 mixture of argon and hydrogen.

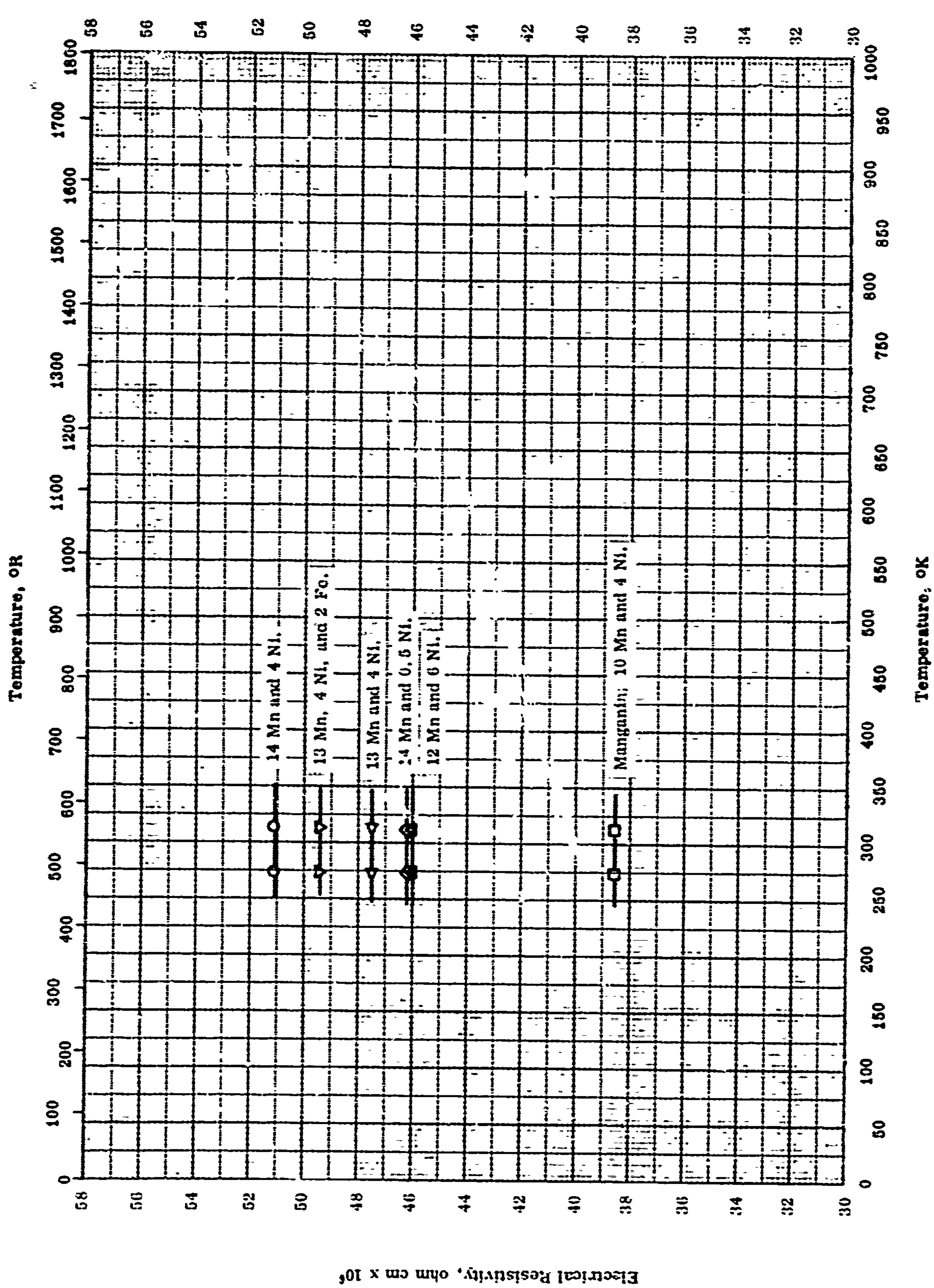


THERMAL LINEAR EXPANSION -- COPPER + LEAD + ΣX_i

THERMAL LINEAR EXPANSION -- COPPER + LEAD + ΣX_i

REFERENCE INFORMATION

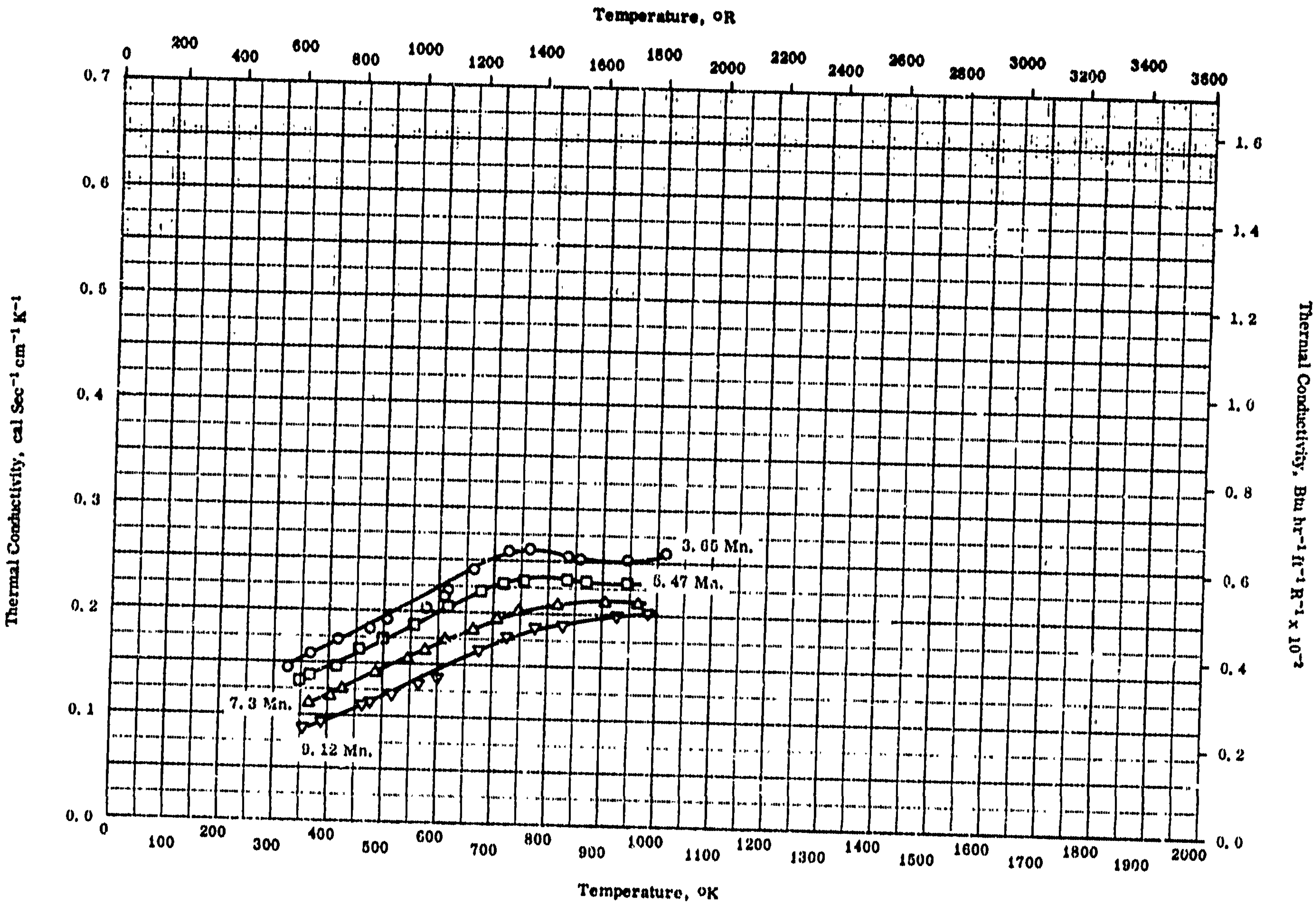
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	43-8	293-773		Lead bronze; 70 Cu, 21 Pb, and 9 Sn.	



ELECTRICAL RESISTIVITY -- COPPER + MANGANESE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	56-32	273-313		Manganin type alloy: 0.86 Mn, 4.35 Ni, 0.083 Fe, 0.008 > Mg, 0.04 > Si, and 0.001 > each of others.	Cast, pickled, cold rolled, annealed 1 hr at 790 C in NH_3 atm., slowly cooled to room temperature, cold drawn, annealed 1 hr at 570 C in NH_3 atm., reannealed and etched.
△	56-32	273-313		11.63 Mn, 6.03 Ni, 0.010 Fe, 0.008 > Mg, 0.004 > Si, and 0.001 > each of others.	Same as above.
◁	56-32	273-313		12.75 Mn, 4.25 Ni, 0.002 Fe, 0.008 > Mg, 0.004 > Si, and 0.001 > each of others.	Same as above.
▽	56-32	273-313		12.87 Mn, 4.27 Ni, 2.03 Fe, 0.008 > Mg, 0.004 > Si, and 0.001 > each of others.	Same as above.
◇	56-32	273-313		13.54 Mn, 0.504 Ni, 0.231 Fe, 0.008 > Mg, 0.004 > Si, and 0.001 > each of others.	Same as above.
○	56-32	273-313		14.13 Mn, 4.26 Ni, 0.281 Fe, 0.008 > Mg, 0.004 > Si, and 0.001 > each of others.	Same as above.

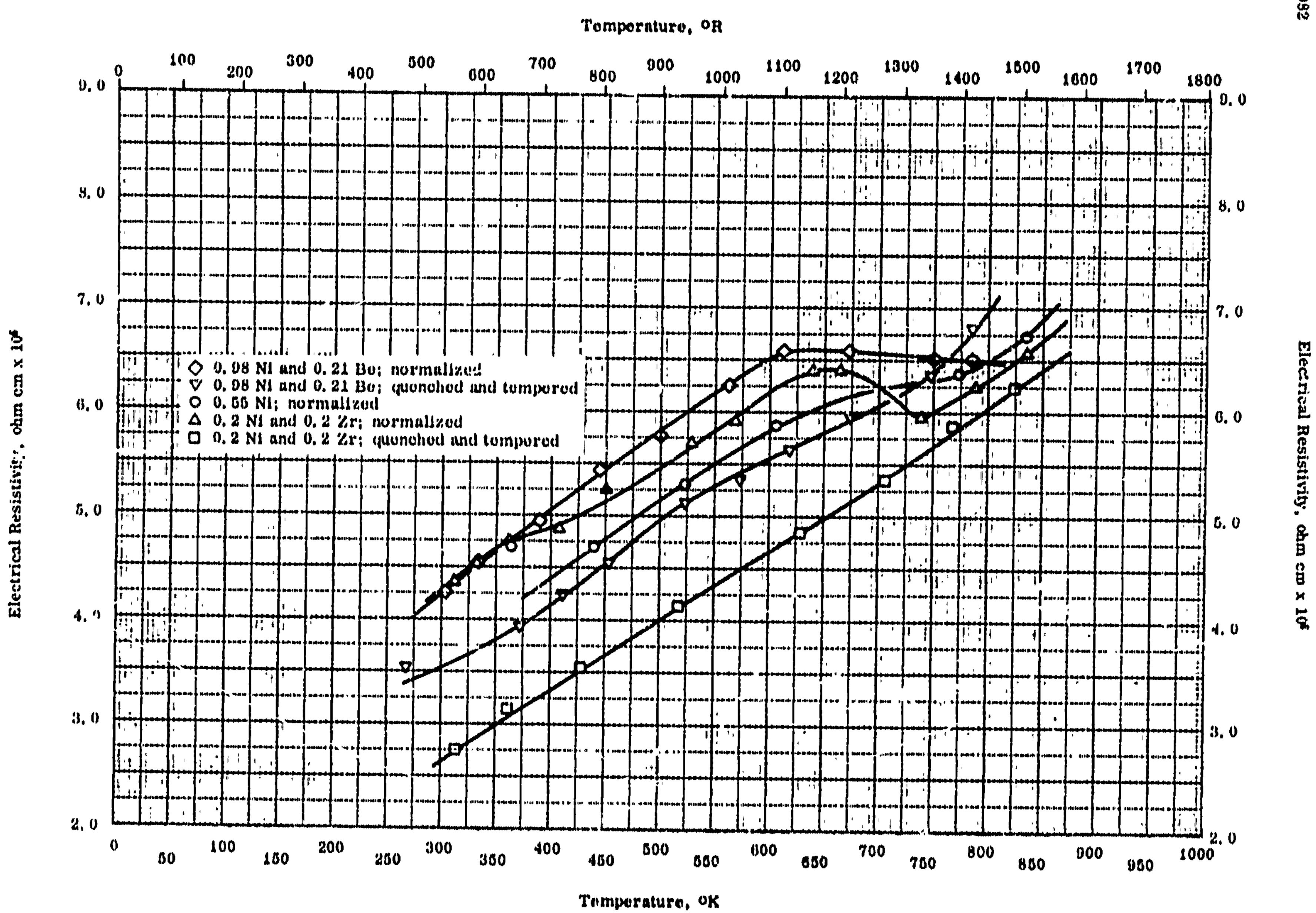


THERMAL CONDUCTIVITY -- COPPER + MANGANESE + ΣX_i

THERMAL CONDUCTIVITY -- COPPER + MANGANESE + ΣX_i

REFERENCE INFORMATION

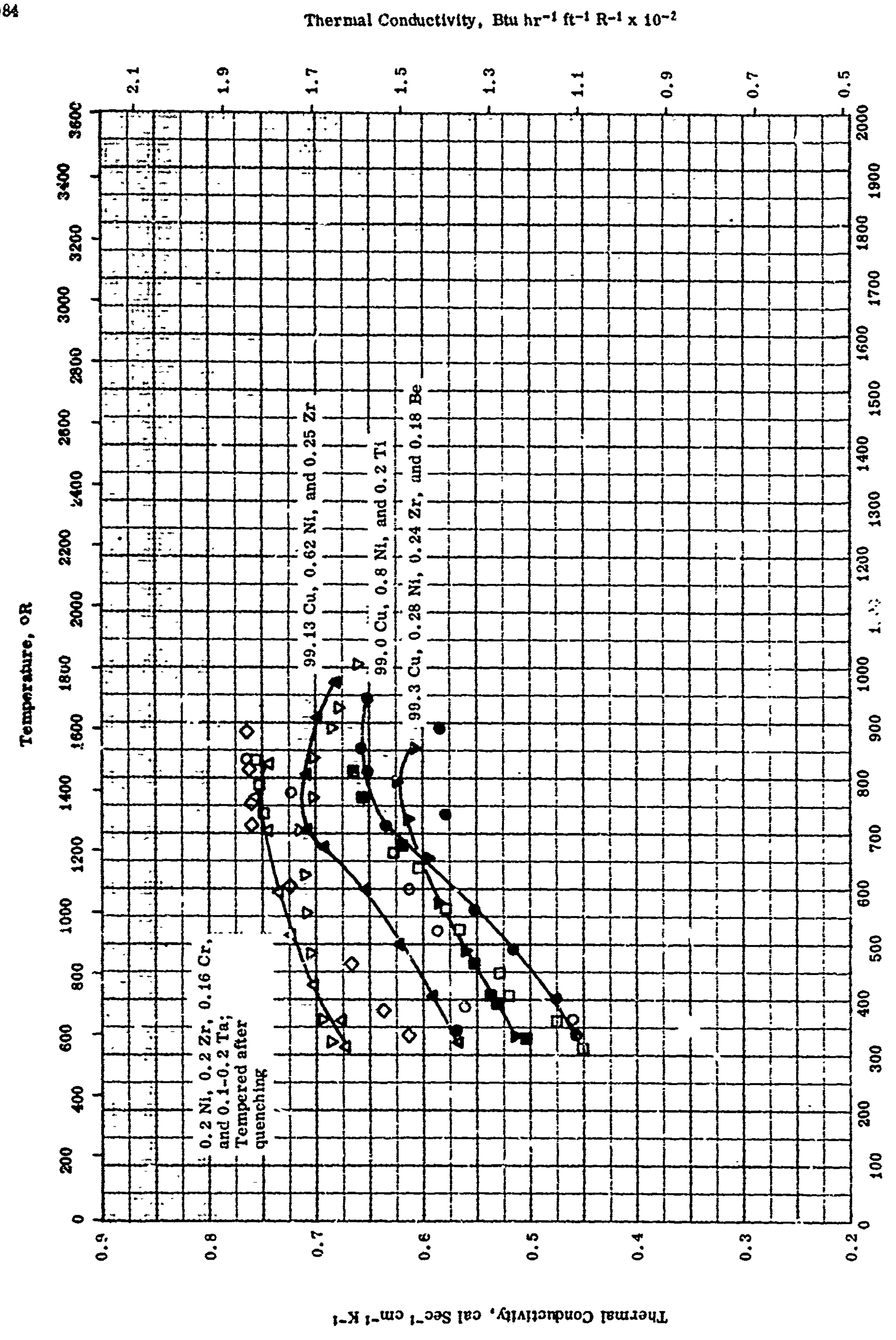
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-5	326-1014		95.45 Cu, 3.65 Mn, and 0.9 Be.	Annealed after hardening in vacuum at 300 C for 6 hrs.
□	58-5	348-946		93.[illegible]3 Cu, 5.47 Mn, and 0.9 Be.	Same as above.
△	58-5	362-963		91.8 Cu, 7.3 Mn, and 0.9 Be.	Same as above.
▽	58-5	353-981		89.91 Cu, 9.12 Mn, and 0.9 Be.	Same as above.



ELECTRICAL RESISTIVITY -- COPPER + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	364-836		0.55 Ni, 0.25 Zr, and 0.107 Be.	Normalized.
◇	56-6	302-784		0.98 Ni and 0.21 Be.	Same as above.
▽	56-6	302-784		Same as above.	Quenched and tempered.
△	56-6	311-835		0.2 Ni, 0.2 Zr, 0.16 Cr, and 0.1-0.2 Ti.	Normalized.
□	56-6	311-835		Same as above.	Quenched and tempered.

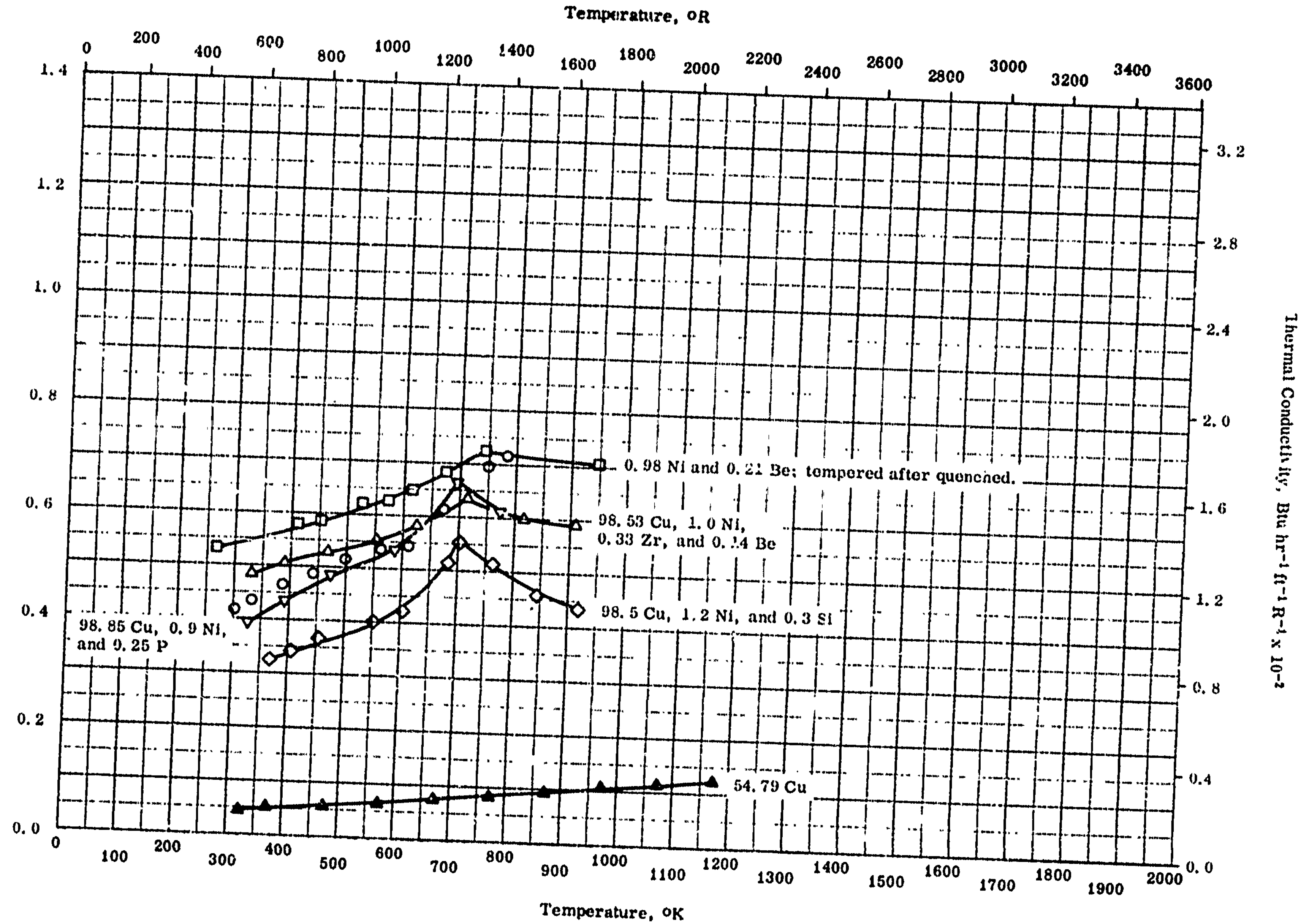


THERMAL CONDUCTIVITY — COPPER + NICKEL + ΣX_i
$(0.2 \le Ni < 0.9)$

THERMAL CONDUCTIVITY -- COPPER + NICKEL + ΣX_i
($0.2 \leq Ni < 0.9$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	364-836		0.55 Ni, 0.25 Zr, and 0.107 Be.	Normalized.
□	56-6	311-835		0.2 Ni, 0.2 Zr, 0.16 Cr, and 0.1-0.2 Ta.	Normalized.
△	56-6	311-835		Same as above.	Tempered after quenching.
▽	57-2	321-1002		0.6 Ni, 0.27 Zr, and 0.1 P.	
◇	57-2	334-684		98.99 Cu, 0.6 Ni, 0.26 Zr, and 0.15 Sn.	
●	57-3	336-948		99.0 Cu, 0.8 Ni, and 0.2 Ti.	
■	57-3	331-815		98.73 Cu, 0.8 Ni, 0.33 Zr, and 0.14 Be.	
▲	57-3	326-974		99.13 Cu, 0.62 Ni, and 0.25 Zr.	
▼	57-3	333-855		99.3 Cu, 0.28 Ni, 0.24 Zr, and 0.18 Be.	

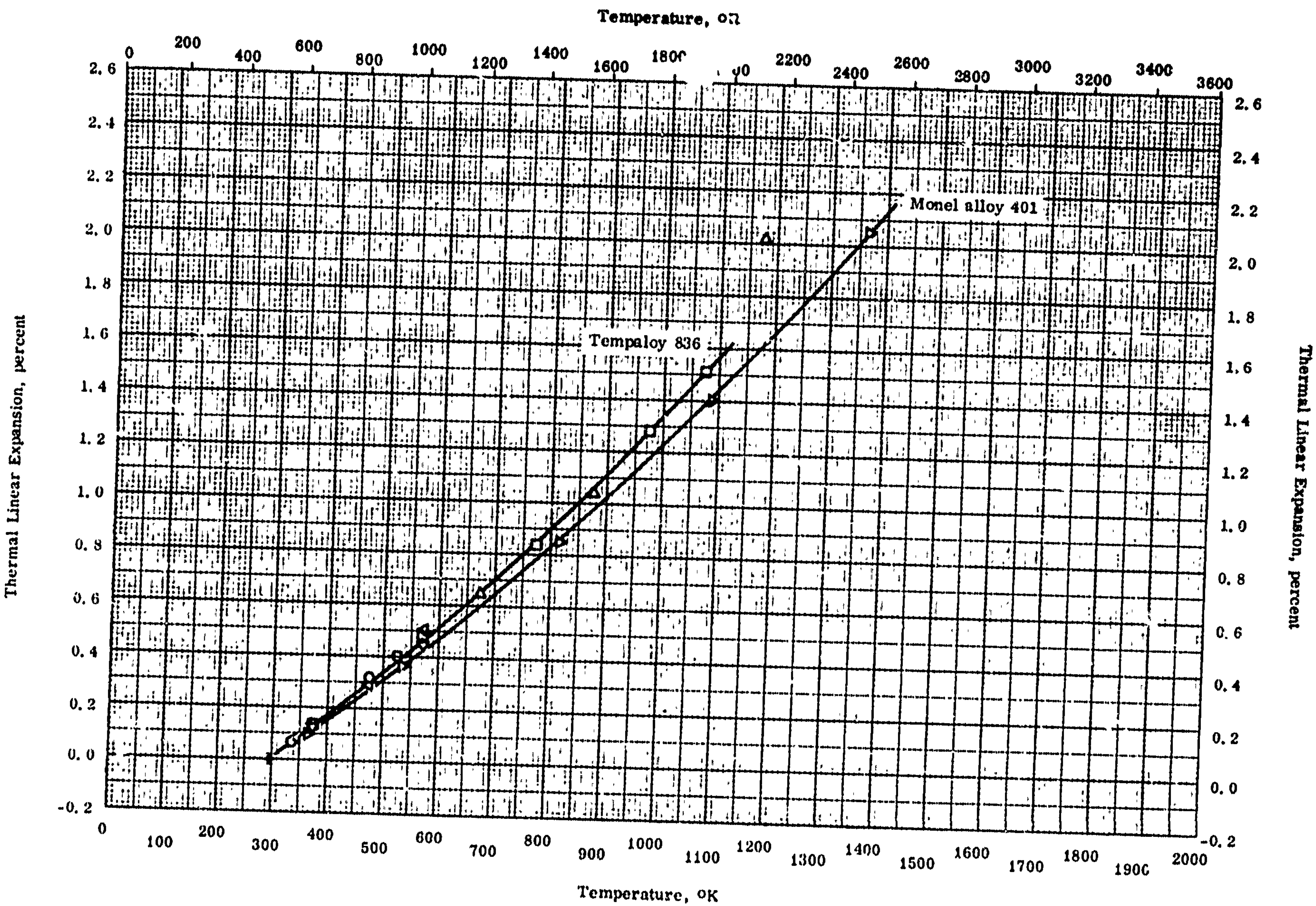


THERMAL CONDUCTIVITY -- COPPER + NICKEL + ΣX_i
($Ni > 0.9$)

THERMAL CONDUCTIVITY -- COPPER + NICKEL + ΣX_i
(Ni :0.9)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	302-784		0.98 Ni and 0.21 Be.	Normalized.
□	56-6	269-950		0.98 Ni and 0.21 Be.	Tempered after quenched.
▲	53-2	323-1173		"Advanced"; 54.79 Cu, 44.04 Ni, 1.20 Mn, 0.035 C, and 0.003 Si.	
▽	57-3	329-773		98.85 Cu, 0.9 Ni, and 0.25 P.	
◇	57-3	370-920		98.5 Cu, 1.2 Ni, and 0.3 Si.	
△	57-3	333-910		98.53 Cu, 1.0 Ni, 0.33 Zr, and 0.14 Be.	



THERMAL LINEAR EXPANSION -- COPPER + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	43-6	293-1073		Tempaloy 836; 96 Cu, 3 Ni, 0.61 Si, a d 0.12 Fe.	Average for 4 samples: (a) cast at 1200 C; (b) cast at 1200 C and annealed; (c) annealed and quenched; (d) cold worked.
○	47-6	293-573		Phosnic bronze; 98.47 Cu, 1.19 Ni, and 0.26 P.	Quenched from 1450 F, aged 1 hr at 800 F; and 18 months at room temperature.
▽	43-6	293-573		Admiralty Nickel; 69.57 Cu, 28.70 Ni, and 0.91 Sn.	Extruded rod; finished hard.
△	43-6	473-1173		68 Cu, 20 Ni, and 12 Sn.	Cast bar.
◁	47-6	293-573		69.42 Cu, 29.53 Ni, 0.53 Mn, 0.07 Fe, and 0.05 Zn.	Annealed at 1300 F.
▷	65-4	293-1366		Monel alloy 401; International Nickel Co.; nominal: 53.0 Cu, 44.5 Ni, 1.70 Mn, 0.50 Co, 0.20 Fe, 0.01 Si, 0.03 C, and 0.005 S; density 0.321 lb in.$^{-3}$.	

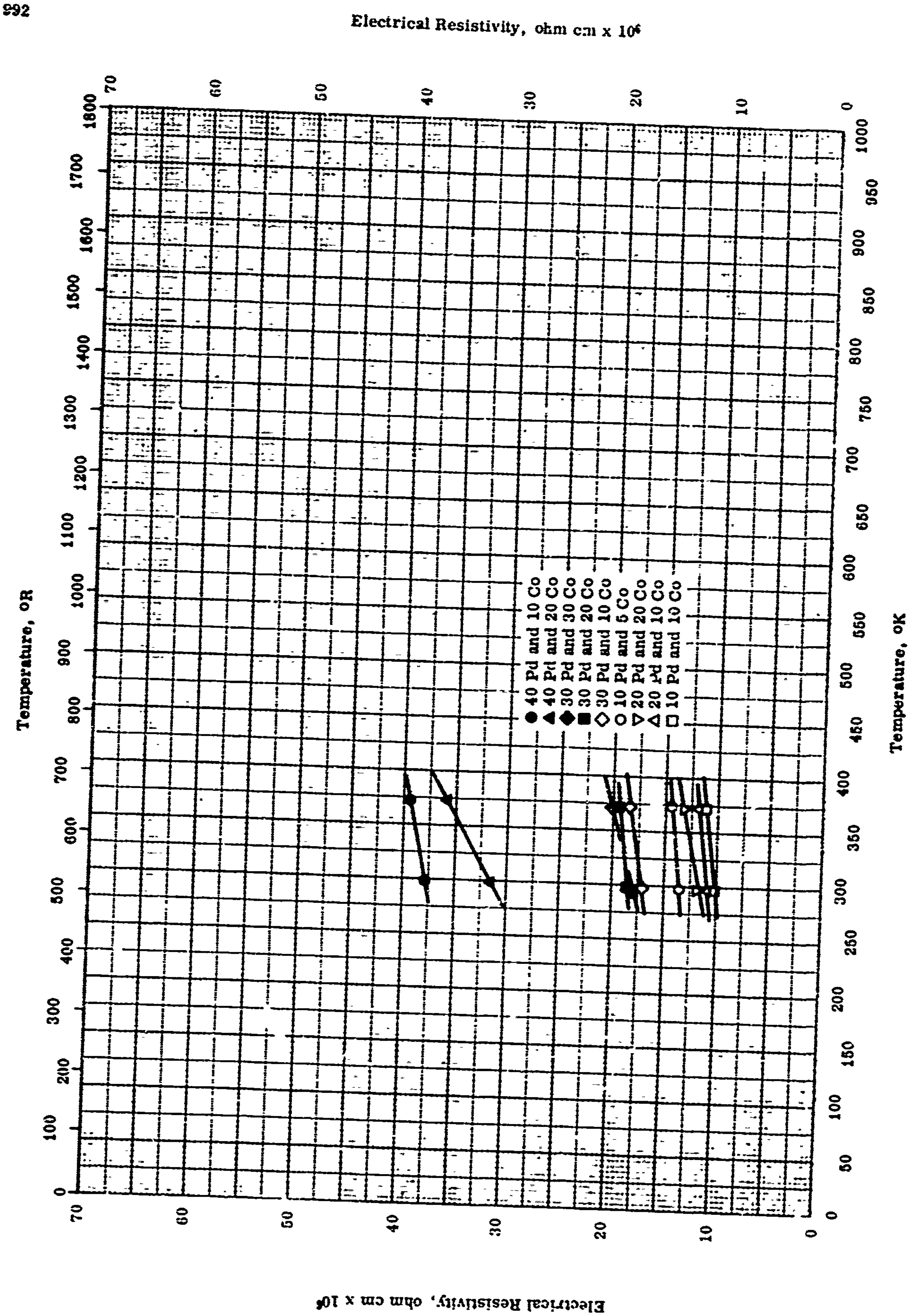
PROPERTIES OF COPPER + PALLADIUM + ΣX_i

REPORTED VALUES

Melting Point	K	R
○ 30 Pd and 10 Co	1356	2441
□ 40 Pd and 10 Co	1434	2582
△ 30 Pd and 20 Co	1380	2485
▽ 30 Pd and 30 Co	1403	2526

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1356		60 Cu, 30 Pd, and 10 Co; from electrolytic Cu and Co with 0.01 > C.	M.P. from break in time-temperature curve during cooling.
□	56-24	1434		50 Cu, 40 Pd, and 10 Co; same as above.	Same as above.
△	56-24	1380		50 Cu, 30 Pd, and 20 Co; same as above.	Same as above.
▽	56-24	1403		40 Cu, 30 Pd, and 30 Co; same as above.	Same as above.

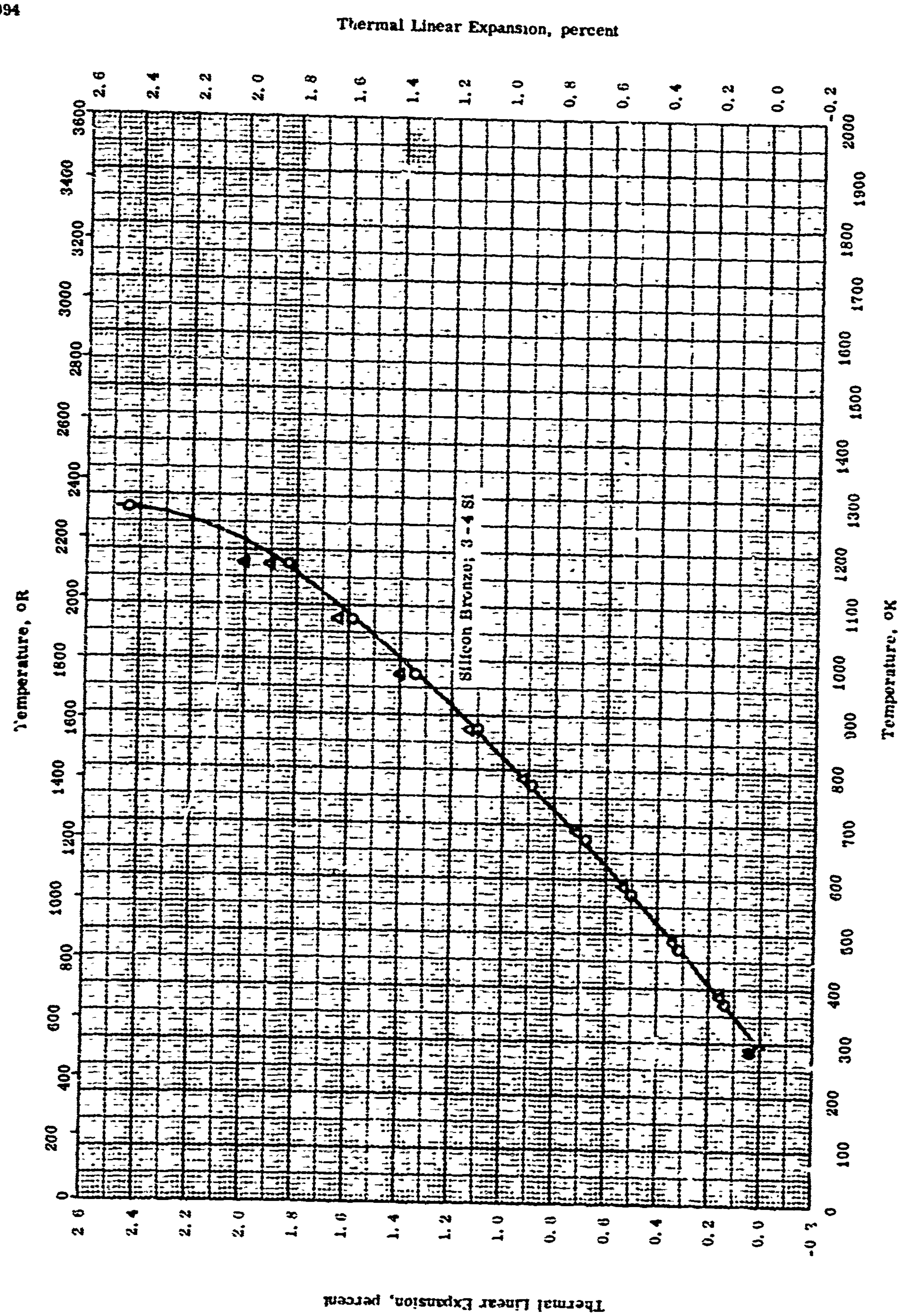


ELECTRICAL RESISTIVITY -- COPPER + PALLADIUM + ΣX_i

ELECTRICAL RESISTIVITY -- COPPER + PALLADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		85 Cu, 10 Pd and 5 Co.	Annealed 150 hrs at 1000 C in vacuum and cooled in 10 hrs.
□	56-24	298-373		80 Cu, 10 Pd and 10 Co.	Same as above.
△	56-24	298-373		70 Cu, 20 Pd and 10 Co.	Same as above.
◇	56-24	298-373		60 Cu, 30 Pd and 10 Co.	Same as above.
▽	56-24	298-373		60 Cu, 20 Pd and 20 Co.	Same as above.
●	56-24	298-373		50 Cu, 40 Pd and 10 Co.	Same as above.
■	56-24	298-373		50 Cu, 30 Pd and 20 Co.	Same as above.
▲	56-24	298-373		40 Cu, 40 Pd and 20 Co.	Same as above.
◆	56-24	298-373		40 Cu, 30 Pd and 30 Co.	Same as above.

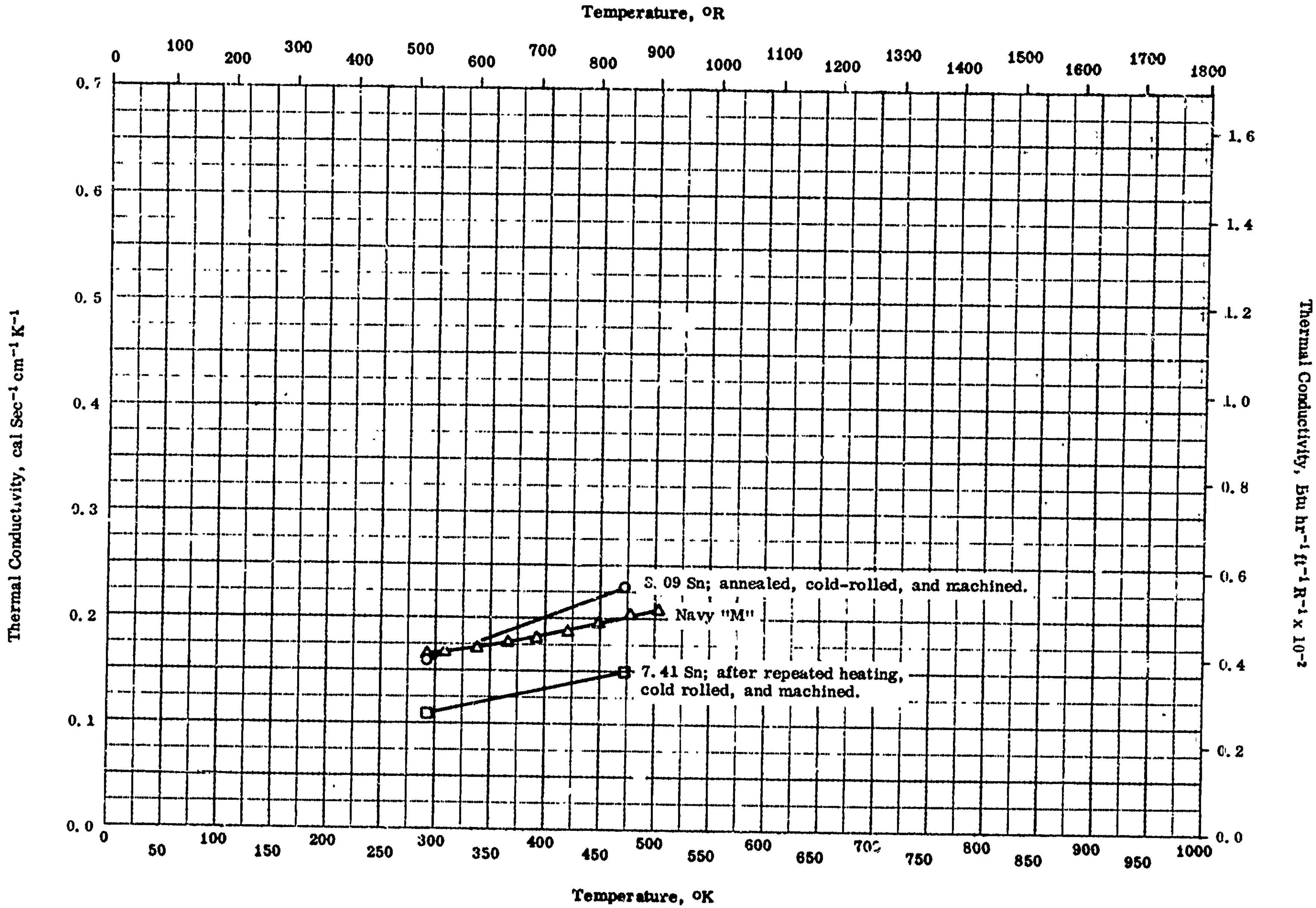


THERMAL LINEAR EXPANSION -- COPPER + SILICON + ΣX_i

THERMAL LINEAR EXPANSION -- COPPER + SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	43-8	293-1273		Silicon Bronze; 95.64 Cu, 3.04 Si, 1.03 Mn, and 0.09 Fe.	2 samples: Hard drawn, and annealed; max deviation 2%.
●	43-3	293-1273		Same as above.	The above specimen, cooling.
△	43-8	293-1173		Silicon Bronze: 94.33 Cu, 4.40 Si, 0.66 Mn, and 0.11 Fe.	Below 2000 R, heating and cooling curves are graphically identical.
▲	43-8	293-1173		Same as above.	

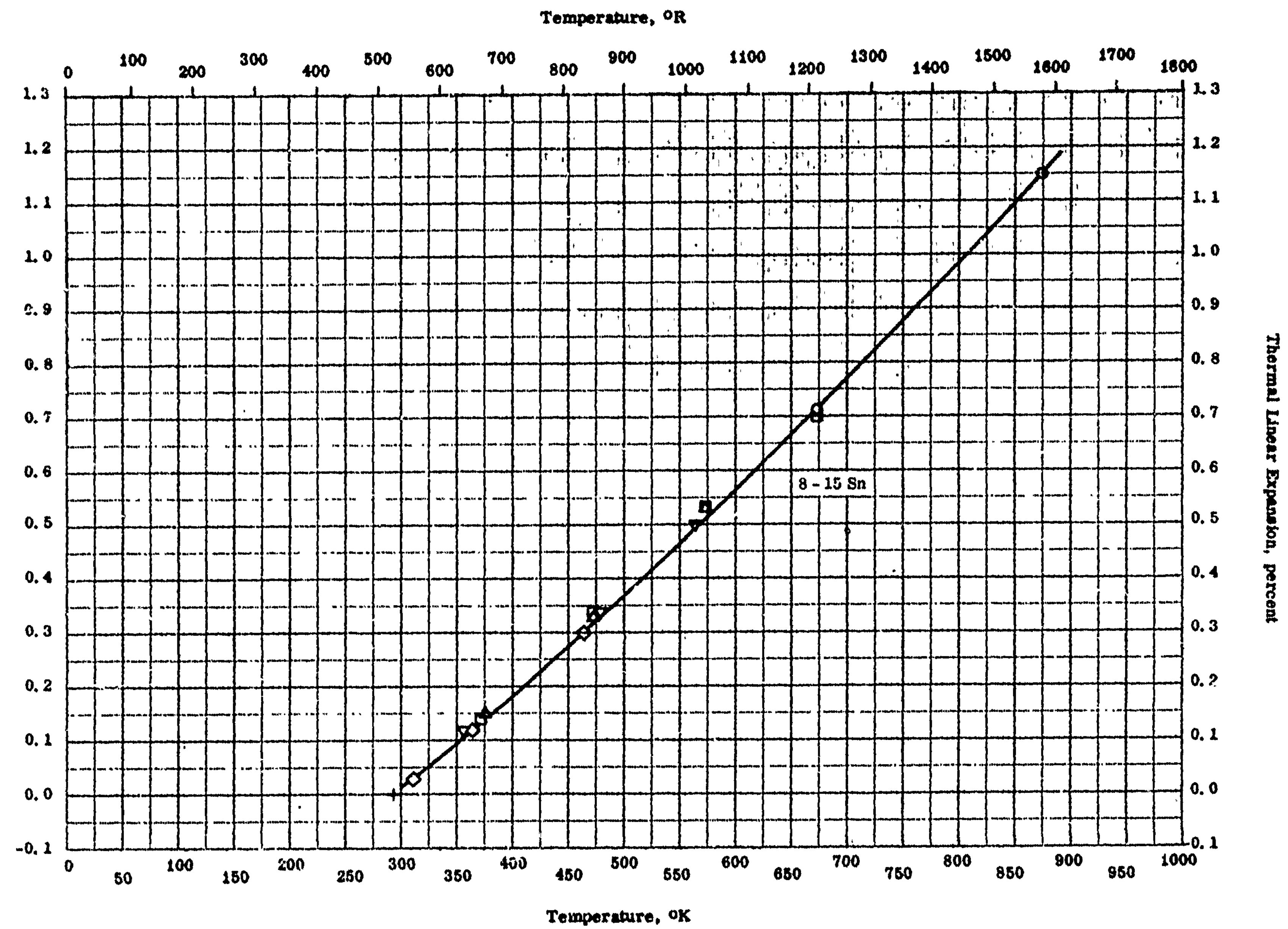


THERMAL CONDUCTIVITY -- COPPER + TIN + ΣX_i

THERMAL CONDUCTIVITY -- COPPER + TIN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	41-1	293-473		96.5 Cu, 3.09 Sn, 0.39 P, 0.01 Fe, 0.01 Ni, 0.005 > Sb, and 0.005 > Pb.	Cast and air cooled; annealed at 625 C, cold-rolled, and machined.
□	41-1	293-473		92.2 Cu, 7.41 Sn, 0.38 P, 0.02 Fe, 0.01 Pb, and 0.005 > Sb.	Cast and air cooled; annealed at 625 C, hot-rolled at 300 C, annealed for 2 1/2 hrs at 625 C, again hot-rolled at 300 C, again annealed for 2 1/2 hrs at 625 C, and then cold-rolled and machined.
△	58-6	292-504	±5	Navy "M"; 88.0 Cu, 5.7 Sn, 4.4 Zn, 1.4 Pb, 0.6 Ni, 0.13 Sb, 0.07 Fe, and 0.01 P.	

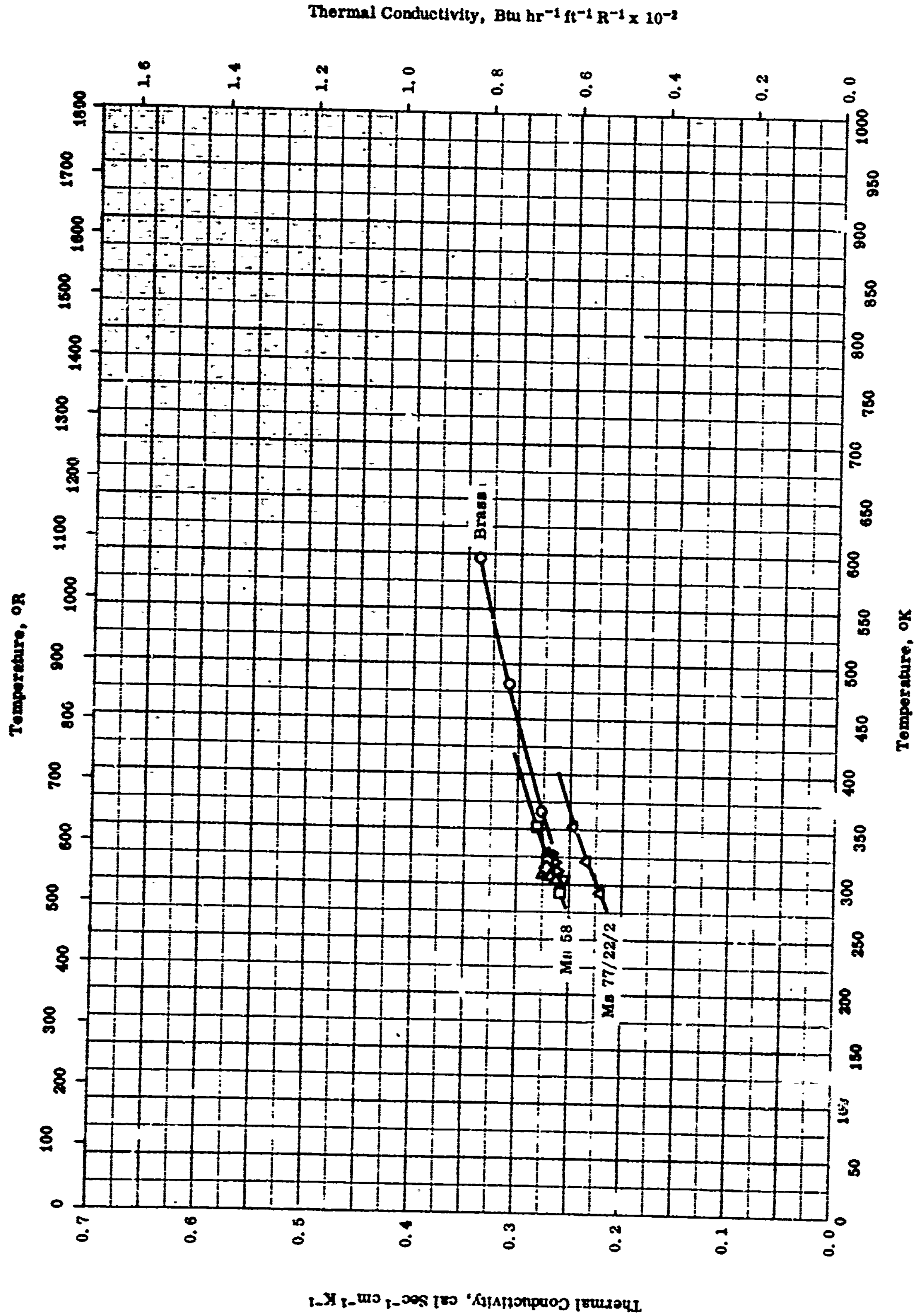


THERMAL LINEAR EXPANSION -- COPPER + TIN + ΣX_i

THERMAL LINEAR EXPANSION -- COPPER + TIN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	43-8	293-673		Sn-Zn Bronze: 88 Cu, 10 Sn, 2 Zn.	Cast.
△	43-8	293-573		Sn-Zn Bronze: 88 Cu, 8 Sn, 4 Zn.	Same as above.
◇	43-8	293-473		Sn-Zn Bronze: 86.7 Cu, 11.2 Sn, 2.1 Zn.	Cast, annealed at 1373 F.
▽	43-8	293-573		Sn-Zn Bronze: 86.5 Cu, 11 Sn, 2.5 Zn.	Cast in green sand mold at about 2250 F.
○	43-6	293-873		Bronze: 84.84 Cu, 14.93 Sn, and 0.21 Pb.	

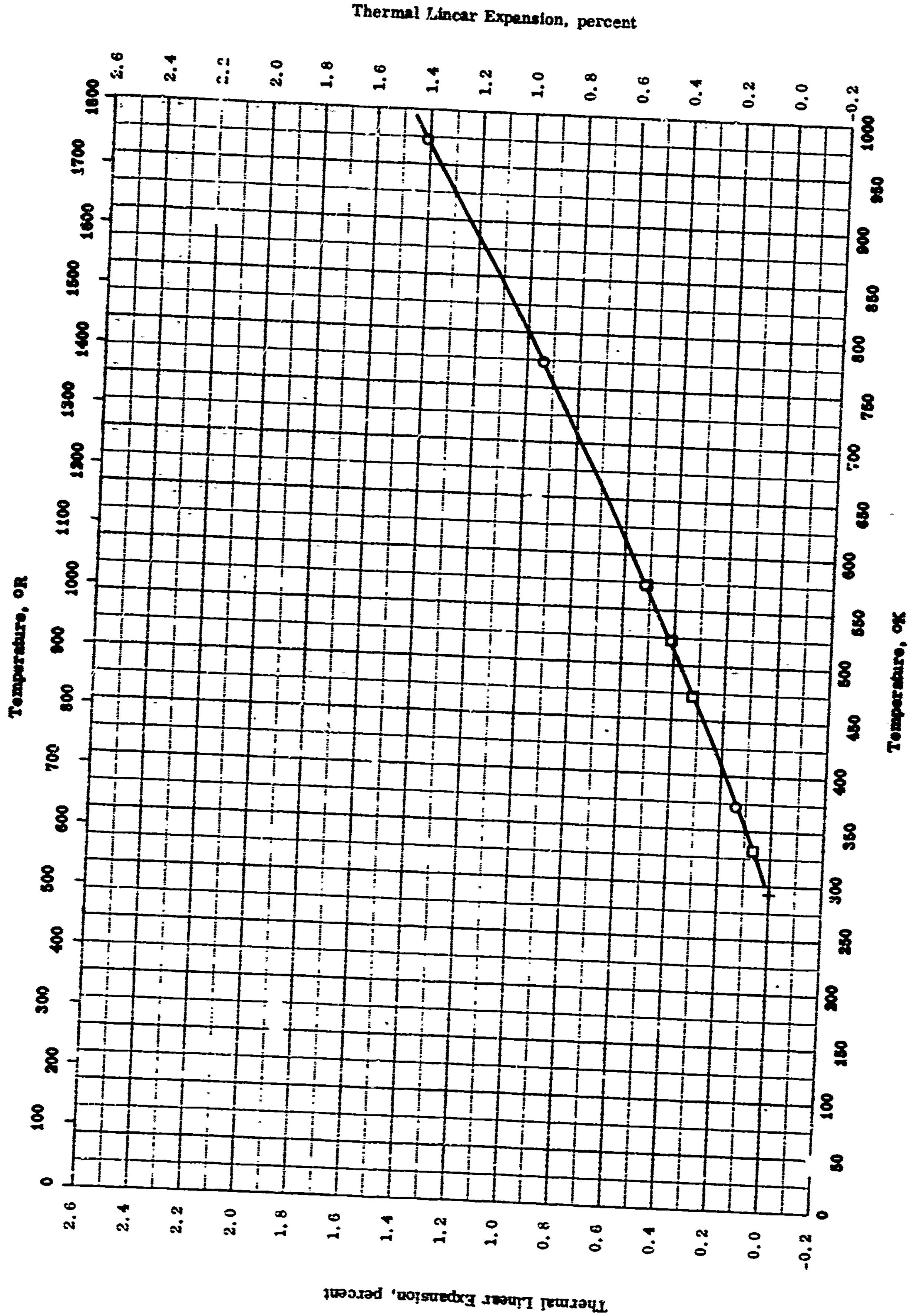


THERMAL CONDUCTIVITY -- COPPER + ZINC + ΣX_i

THERMAL CONDUCTIVITY -- COPPER + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-3	367-603	±4	Brass; 35.5 Zn, 3 Pb.	Rod.
□	58-3	293-353	1	Ms 53; 58.1 Cu, 39.2 Zn, 2.2 Pb, 0.3 Sn, and 0.1 Fe.	
△	58-3	293-353	1	Ms 77/22/2; 77.27 Cu, 20.77 Zn, 1.96 Al, and traces of Mn and Ni.	
▽	60-4	313-328	±3	Yellow brass; 77 Cu, 22 Zn, 4 Pb, 2 Sn.	Annealed for 17 hrs at 500 C at ordinary atmosphere; measured by using steel as standard.
◁	60-4	305-325	±3	Same as above.	Same as above except using Ni as standard.
▷	60-4	301-320	±3	Same as above.	Same as above except using yellow brass as standard.
◇	60-4	306-318	±3	Same as above.	Same as above except using Al as standard.

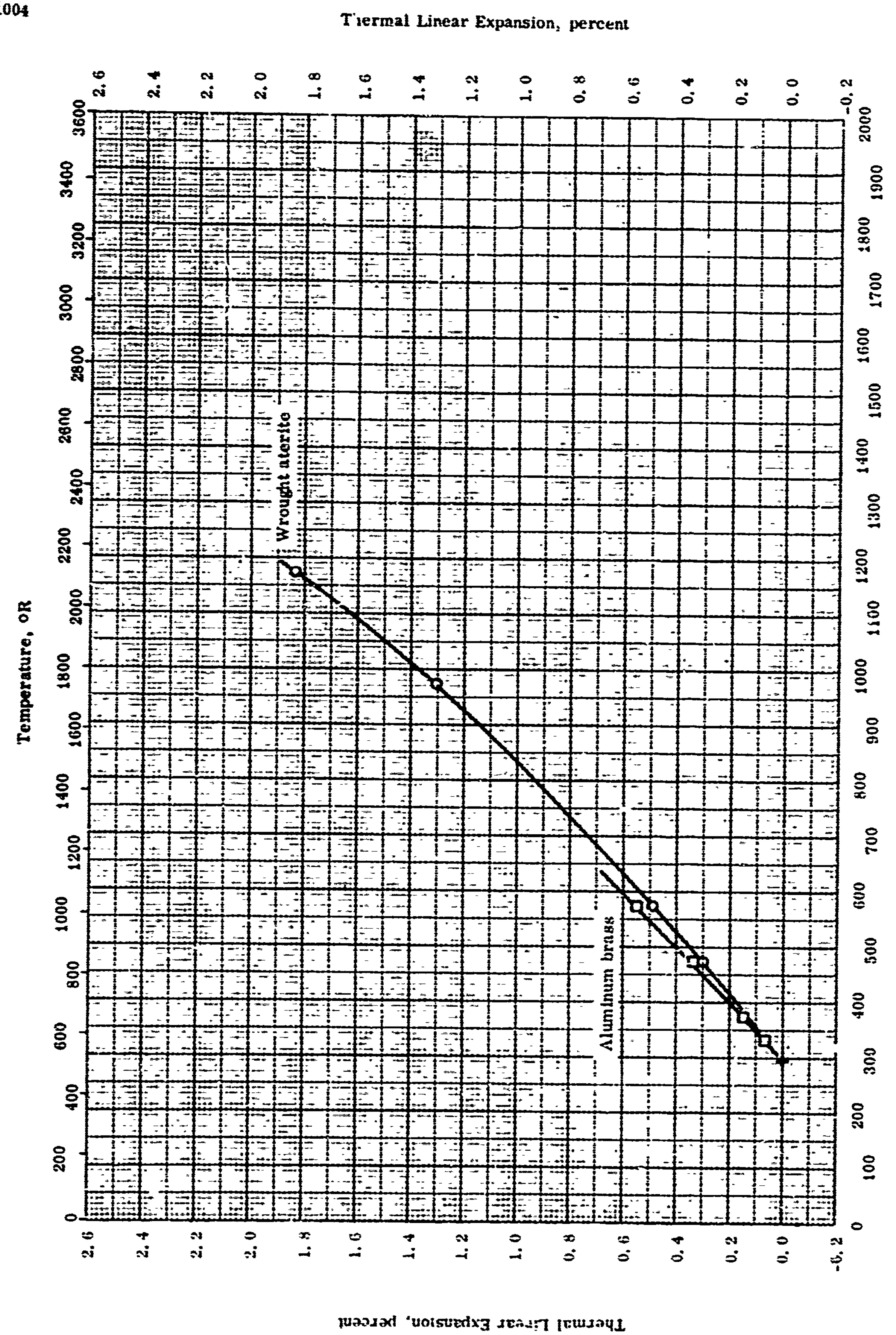


THERMAL LINEAR EXPANSION -- COPPER + ZINC + ΣX_i
($5 < Zn < 10$)

THERMAL LINEAR EXPANSION -- COPPER + ZINC + ΣX_i
($5 < Zn < 10$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	43-6	273-973		Red Brass: 84.96 Cu, 5.15 Zn, 5.02 Sn, 4.87 Pb.	Cast rod.
□	47-6	293-573		Tellurium nickel brass; 88.84 Cu, 9.28 Zn, 1.15 Ni, 0.52 Te, and 0.21 Pb.	Data average of 4 samples: quenched from 1450 F, aged 1 hr at 770 to 850 F and 18 to 40 months at room temperature; two of above cold drawn 34% after quenching.

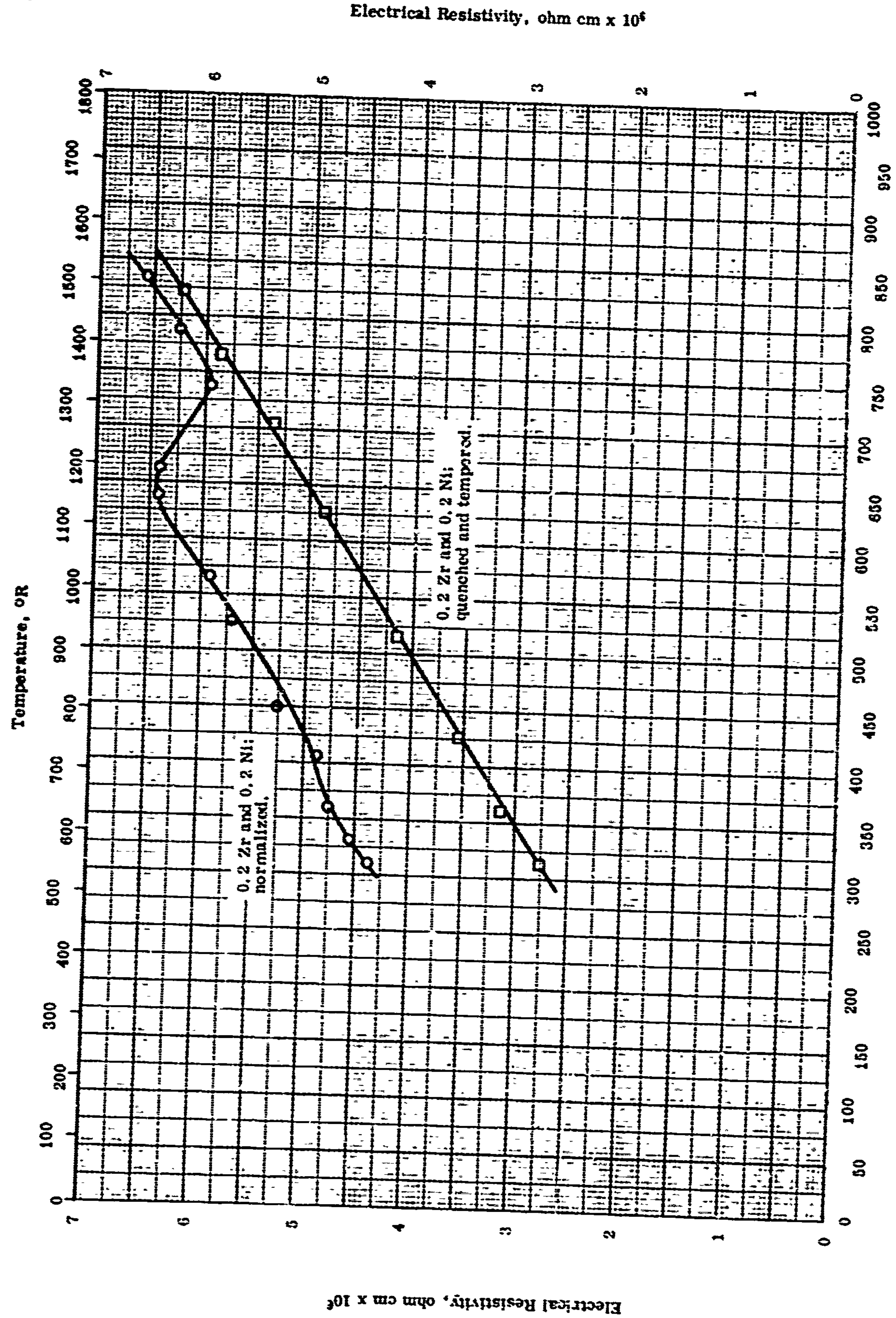


THERMAL LINEAR EXPANSION -- COPPER + ZINC + ΣX_i
$(21 < Zn \leq 22)$

THERMAL LINEAR EXPANSION -- COPPER + ZINC + ΣX_i
($21 < Zn \leq 22$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	47-6	293-573		Aluminum Brass; 76.60 Cu, 21.47 Zn, 1.91 Al, < 0.05 Pb, 0.02 Fe.	Annealed at 1200 F.
○	43-6	293-1173		Wrought Atorite; 65 Cu, 22 Zn, 11 Ni, 1.5 Fe, and 0.5 Mn.	Cold-drawn.

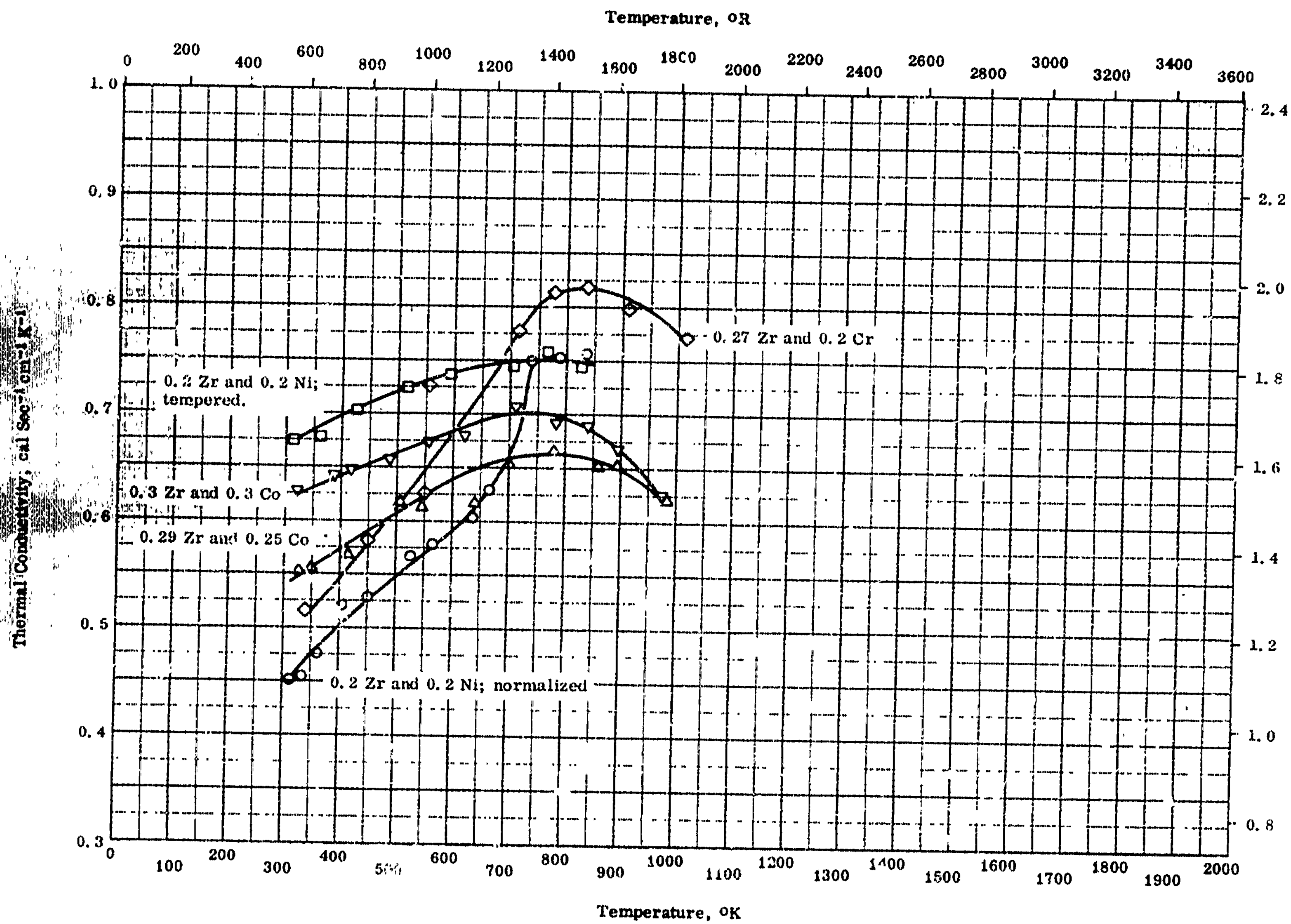


ELECTRICAL RESISTIVITY -- COPPER + ZIRCONIUM + ΣX_i

ELECTRICAL RESISTIVITY -- COPPER + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	311-835		0.2 Zr, 0.2 Ni, 0.16 Cr, and 0.1-0.2 Ti.	Normalized.
□	56-6	311-823		Same as above.	Quenched and tempered.

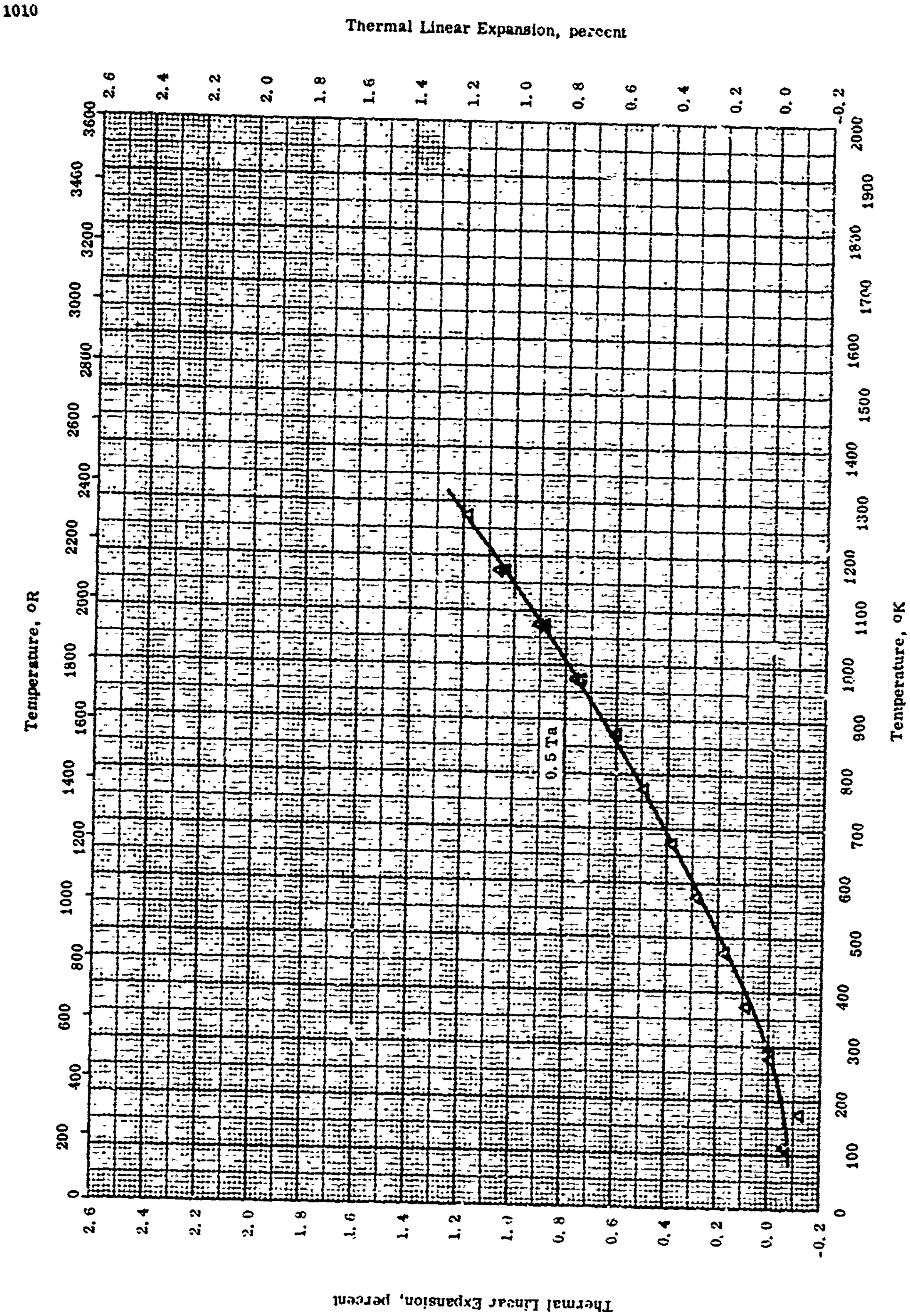


THERMAL CONDUCTIVITY -- COPPER + ZIRCONIUM + ΣX_i

THERMAL CONDUCTIVITY -- COPPER + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-6	311-835		0.2 Zr, 0.2 Ni, 0.16 Cr, and 0.1-0.2 Ta.	Normalized.
□	56-6	311-835		Same as above.	Tempered after quenching.
△	57-2	328-982		99.26 Cu, 0.29 Zr, 0.25 Co, and 0.02 Al.	
▽	57-2	321-972		99.40 Cu, 0.3 Zr, and 0.3 Co.	
◇	57-3	340-101[illegible]		0.27 Zr and 0.2 Cr.	



THERMAL LINEAR EXPANSION -- DYSPROSIUM + TANTALUM + ΣX_i

THERMAL LINEAR EXPANSION -- DYSPROSIUM + ANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	56-42 also 57-51	113-1273	±1	99 Dy, 0.5 Ta, 0.2 Ca, 0.1 Tb, 0.05 Ho, 0.02 Er, 0.02 Si, 0.01 C, 0.005 Fe, 0.003 N_2, and no trace of Gd.	Heating.
▲	56-42 also 57-51	973-1273	±1	Same as above.	The above specimen, cooling.

PROPERTIES OF GOLD + COBALT + ΣX_i

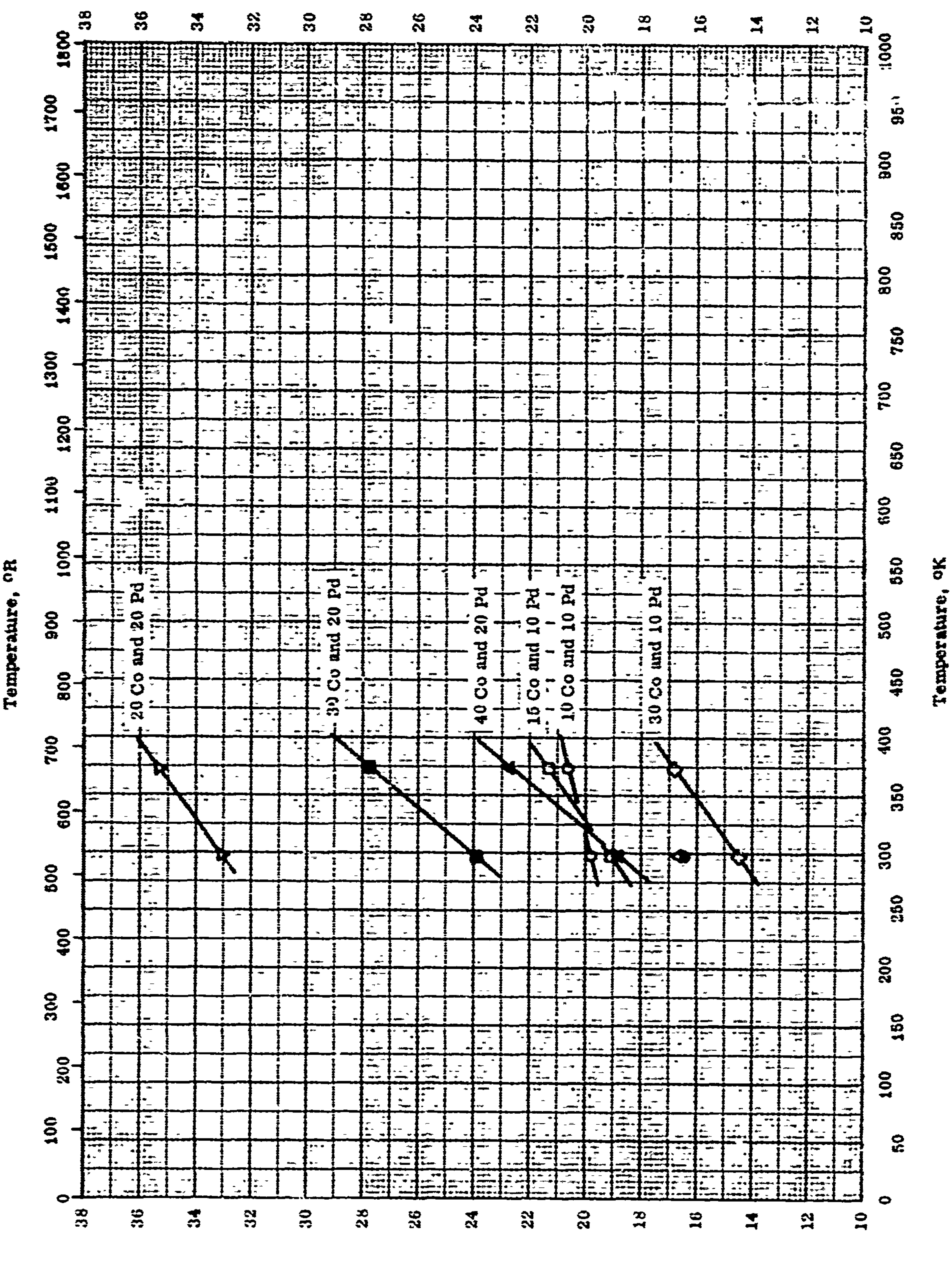
REPORTED VALUES

Melting Point		K	R
○	10 Co and 10 Pd	1312	2362
□	14.8 Co and 10.2 Pd	1266	2279
△	19.9 Co and 9.9 Pd	1296	2333
▽	30 Co and 10 Pd	1303	2346
◇	20 Co and 20 Pd	1343	2418
●	40 Co and 10 Pd	1315	2367
■	30 Co and 20 Pd	1363	2454
▲	40 Co and 20 Pd	1463	2634

PROPERTIES OF GOLD + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	1312		80 Au, 10 Co, and 10 Pd; ingredients with <0.01 impurities.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled; M.P. from break in time-temperature curve during cooling.
□	56-25	1266		75 Au, 14.8 Co, and 10.2 Pd; same as above.	Same as above.
△	56-25	1296		70.2 Au, 19.9 Co, and 9.9 Pd; same as above.	Same as above.
▽	56-25	1303		60 Au, 30 Co, and 10 Pd; same as above.	Same as above.
◇	56-25	1343		60 Au, 20 Co, and 20 Pd; same as above.	Same as above.
●	56-25	1315		50 Au, 40 Co, and 10 Pd; same as above.	Same as above.
■	56-25	1363		50 Au, 30 Co, and 20 Pd; same as above.	Same as above.
▲	56-25	1463		40 Au, 40 Co, and 20 Pd; same as above.	Same as above.



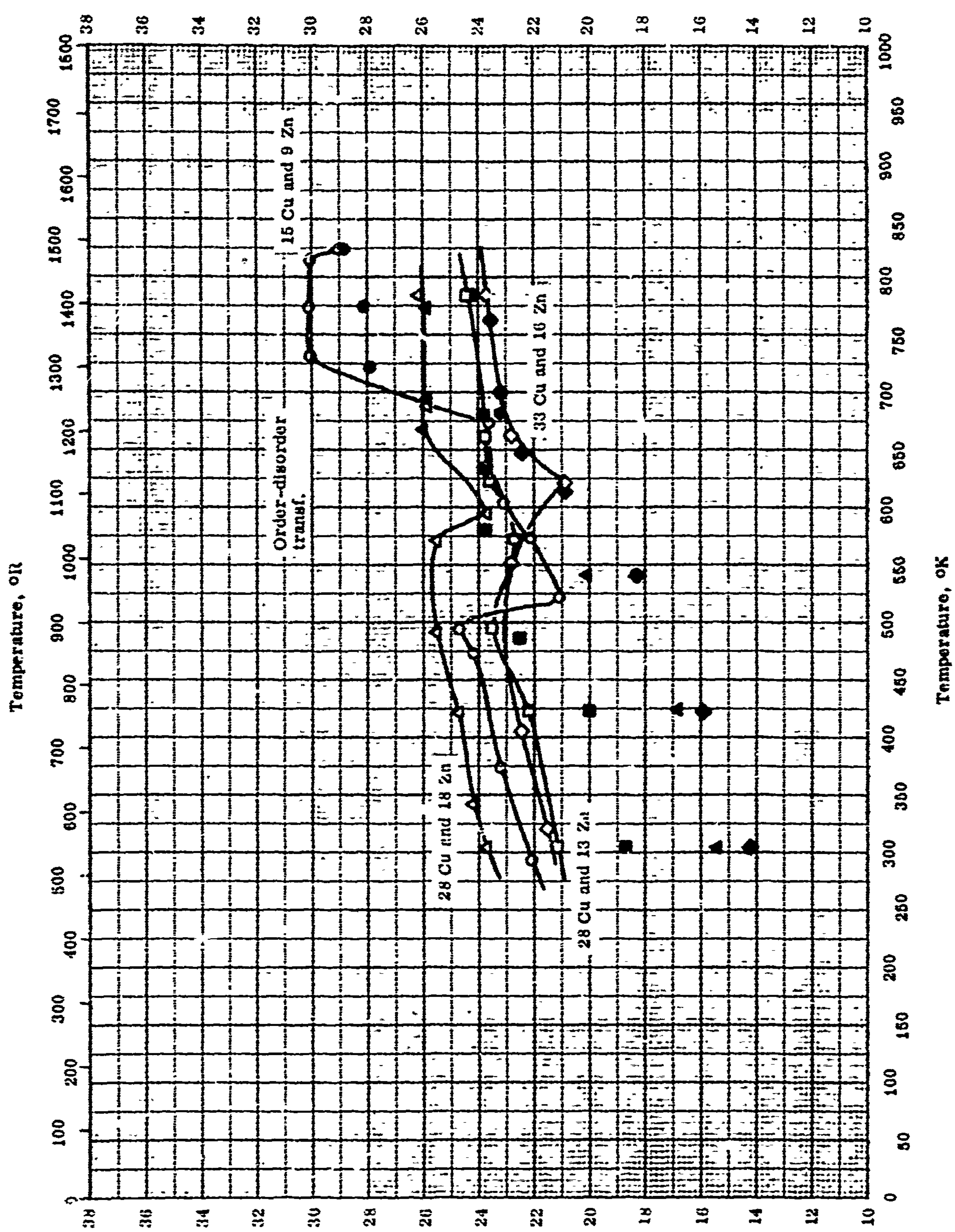
ELECTRICAL RESISTIVITY -- GOLD + COBALT + ΣX_i

ELECTRICAL RESISTIVITY -- GOLD + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	298-373		80 Au, 10 Co and 10 Pd.	Annealed 100-150 hrs close to solidus temp. in vacuum and cooled slowly to room temp.
□	56-25	298-373		75 Au, 14.8 Co and 10 Pd.	Same as above.
△	56-25	298-373		70.2 Au, 19.9 Co and 9.9 Pd.	Same as above.
◇	56-25	298-373		60 Au, 30 Co and 10 Pd.	Same as above.
▽	56-25	298-373		60 Au, 20 Co and 20 Pd.	Same as above.
●	56-25	298-373		50 Au, 40 Co and 10 Pd.	Same as above.
■	56-25	298-373		50 Au, 30 Co and 20 Pd.	Same as above.
▲	56-25	298-373		40 Au, 40 Co and 20 Pd.	Same as above.

Electrical Resistivity, ohm cm x 10^6



Electrical Resistivity, ohm cm x 10^6

ELECTRICAL RESISTIVITY — GOLD + COPPER + ΣX_i

ELECTRICAL RESISTIVITY -- GOLD + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-8	298-823		76.08 Au, 15.29 Cu, and 8.63 Zn.	Measured heating.
●	50-8	298-823		Same as above.	Measured cooling.
□	50-8	303-783		57.3 Au, 29.4 Cu, and 13.3 Zn.	Measured heating.
■	50-8	303-783		Same as above.	Measured cooling.
△	50-8	303-783		53.4 Au, 28.2 Cu, and 18.4 Zn.	Measured heating.
▲	50-8	303-783		Same as above.	Measured cooling.
◇	50-8	303-783		50.8 Au, 32.8 Cu, and 16.4 Zn.	Measured heating.
◆	50-8	303-783		Same as above.	Measured cooling.

PROPERTIES OF GOLD + PALLADIUM + ΣX_i

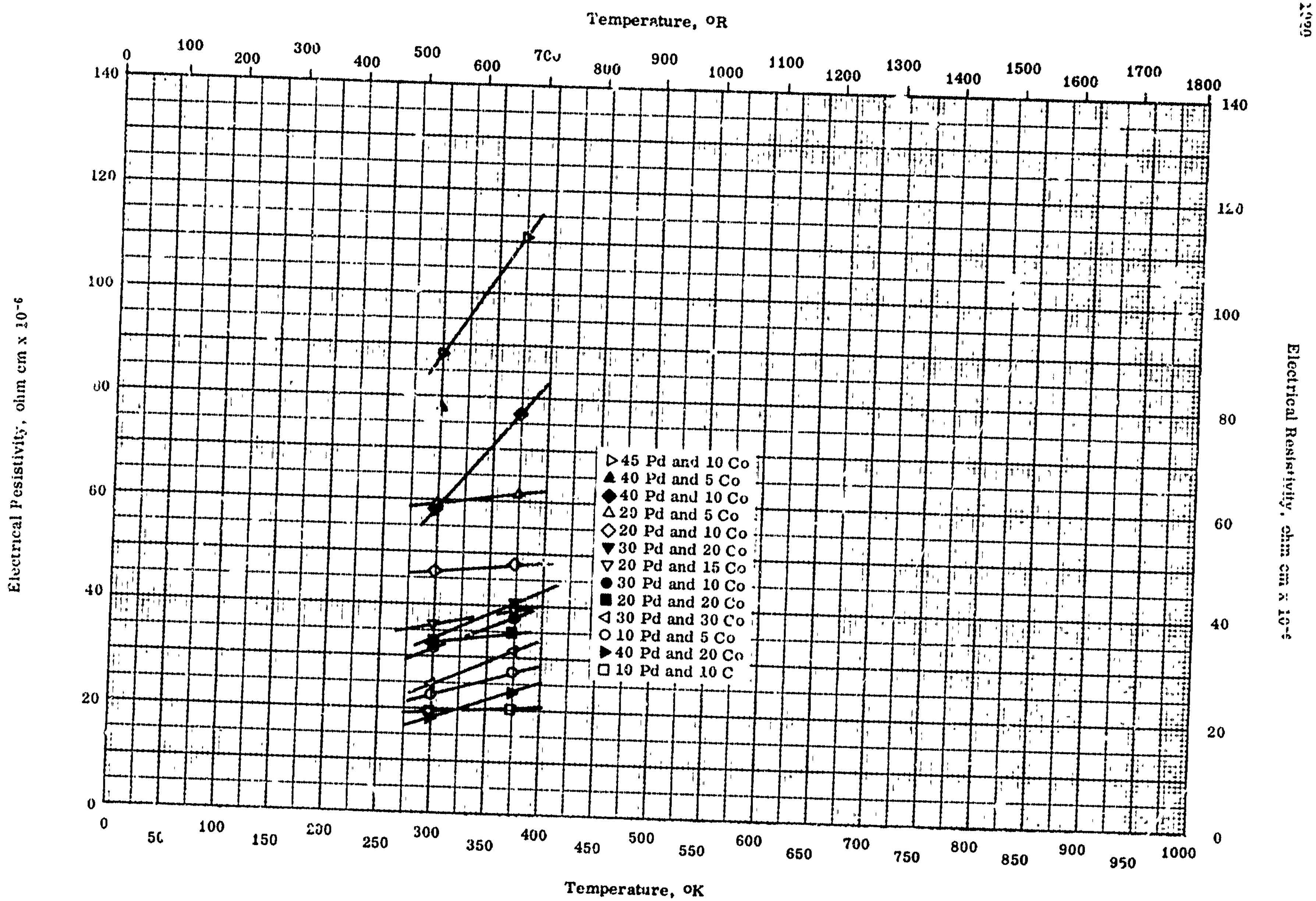
REPORTED VALUES

Melting Point:	K	R
○ 10.1 Pd and 4.8 Co	1468	2643
□ 10 Pd and 10 Co	1312	2362
△ 20.1 Pd and 4.7 Co	1555	2799
▽ 20 Pd and 10 Co	1467	2641
◇ 20 Pd and 15 Co	1410	2538
◁ 30 Pd and 10 Co	1514	2725
▷ 20 Pd and 20 Co	1343	2418
● 40.1 Pd and 4.7 Co	1553	2796
■ 40.0 Pd and 10.0 Co	1473	2652
▲ 30.0 Pd and 20.0 Co	1466	2639
▼ 45.0 Pd and 10 Co	1533	2760
◆ 30.1 Pd and 29.7 Co	1473	2652
◀ 40 Pd and 20 Co	1466	2639

PROPERTIES OF GOLD + PALLADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	1468		85.1 Au, 10.1 Pd, and 4.8 Co; ingredients with <0.01 impurities.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled; M.P. by break in time-temperature curve during cooling.
□	56-25	1312		80 Au, 10 Pd, and 10 Co; same as above.	Same as above.
△	56-25	1555		75.2 Au, 20.1 Pd and 4.7 Co; same as above.	Same as above.
▽	56-25	1467		70 Au, 20 Pd, and 10 Co; same as above.	Same as above.
◇	56-25	1410		65 Au, 20 Pd, and 15 Co; same as above.	Same as above.
◁	56-25	1514		60 Au, 30 Pd, and 10 Co; same as above.	Same as above.
▷	56-25	1343		60 Au, 20 Pd, and 20 Co; same as above.	Same as above.
●	56-25	1553		55.2 Au, 40.1 Pd, and 4.7 Co; same as above.	Same as above.
■	56-25	1473		50.0 Au, 40 Pd, and 10 Co; same as above.	Same as above.
▲	56-25	1466		50 Au, 30 Pd, and 20 Co; same as above.	Same as above.
▼	56-25	1533		45 Au, 45 Pd, and 10 Co; same as above.	Same as above.
◆	56-25	1473		40.2 Au, 30.1 Pd, and 29.7 Co; same as above.	Same as above.
◀	56-25	1466		40. Au, 40 Pd, and 20 Co; same as above.	Same as above.



ELECTRICAL RESISTIVITY -- GOLD + PALLADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	298-373		85. 1 Au, 10. 1 Pd and 4. 8 Co.	Annealed 100-150 hrs close to solidus temp. in vacuum; cooled slowly to room temp.
□	56-25	298-373		80 Au, 10 Pd and 10 Co.	Same as above.
△	56-25	298-373		75. 2 Au, 20. 1 Pd and 4. 7 Co.	Same as above.
◇	56-25	298-373		70 Au, 20 Pd and 10 Co.	Same as above.
▽	56-25	298-373		65 Au, 20 Pd, and 15 Co.	Same as above.
●	56-25	298-373		60 Au, 30 Pd and 10 Co.	Same as above.
■	56-25	298-373		60 Au, 20 Pd and 20 Co.	Same as above.
▲	56-25	298-373		55. 2 Au, 40. 1 Pd and 4. 7 Co.	Same as above.
◆	56-25	298-373		50 Au, 40 Pd and 10 Co.	Same as above.
▼	56-25	298-373		50 Au, 30 Pd and 20 Co.	Same as above.
▷	56-25	298-373		45 Au, 45 Pd and 10 Co.	Same as above.
◁	56-25	298-373		40. 2 Au, 30. 1 Pd and 29. 7 Co.	Same as above.
▶	56-25	298-373		40 Au, 40 Pd and 20 Co.	Same as above.

PROPERTIES OF LANTHANUM + MAGNESIUM + ΣX_i

REPORTED VALUES

		g cm^{-3}	lb ft^{-3}
Density:			
□	1.0> Mg and 0.42 Fe	6.07	379

		K	R
Melting Point:			
○	1.02 Mg and 0.55 Fe	1152	2074

PROPERTIES OF LANTHANUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	43-3	1152		98 La, 1.02 Mg, 0.55 Fe, and 0.05 S.	
□	52-11	298		1.0 > Mg, 0.42 Fe, 0.025 Ca, and 0.01 >other rare earth; 67 % hexagonal close packed phase and 33%face centered cubic phase.	Cast.

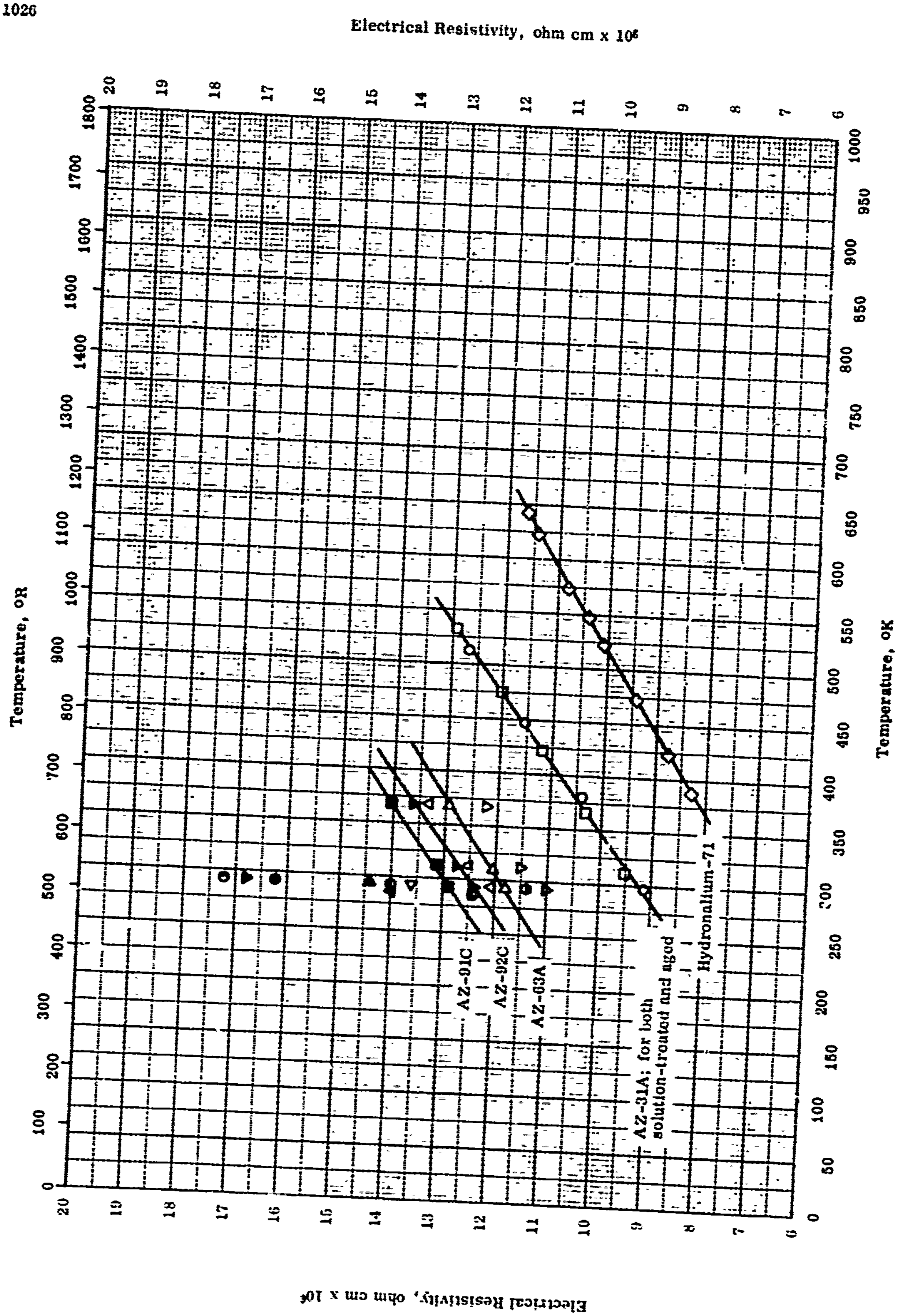
PROPERTIES OF MAGNESIUM + ALUMINUM + ΣX_i

REPORTED VALUES

Density		g cm^{-3}	lb ft^{-3}
○	AN-M-29	1.78	111
Melting Point		K	R
□	AZ 31A and B	838	1508
Heat of Fusion		cal g^{-1}	Btu lb^{-1}
△	AZ 31A and B	81 ± 2	146 ± 4

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	293		An-M-29; 95.7 Mg, 3 Al, 1.0 Zn, and 0.3 Mn; nominal composition.	Hot-rolled, annealed 1 hr at 600 F, and furnace cooled.
□	57-18	838		AZ 31 A and B; 95.9 Mg, 3.0 Al, 1.0 Zn, and 0.5 Mn; nominal composition.	
△	57-18	838		Same as above.	



ELECTRICAL RESISTIVITY -- MAGNESIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

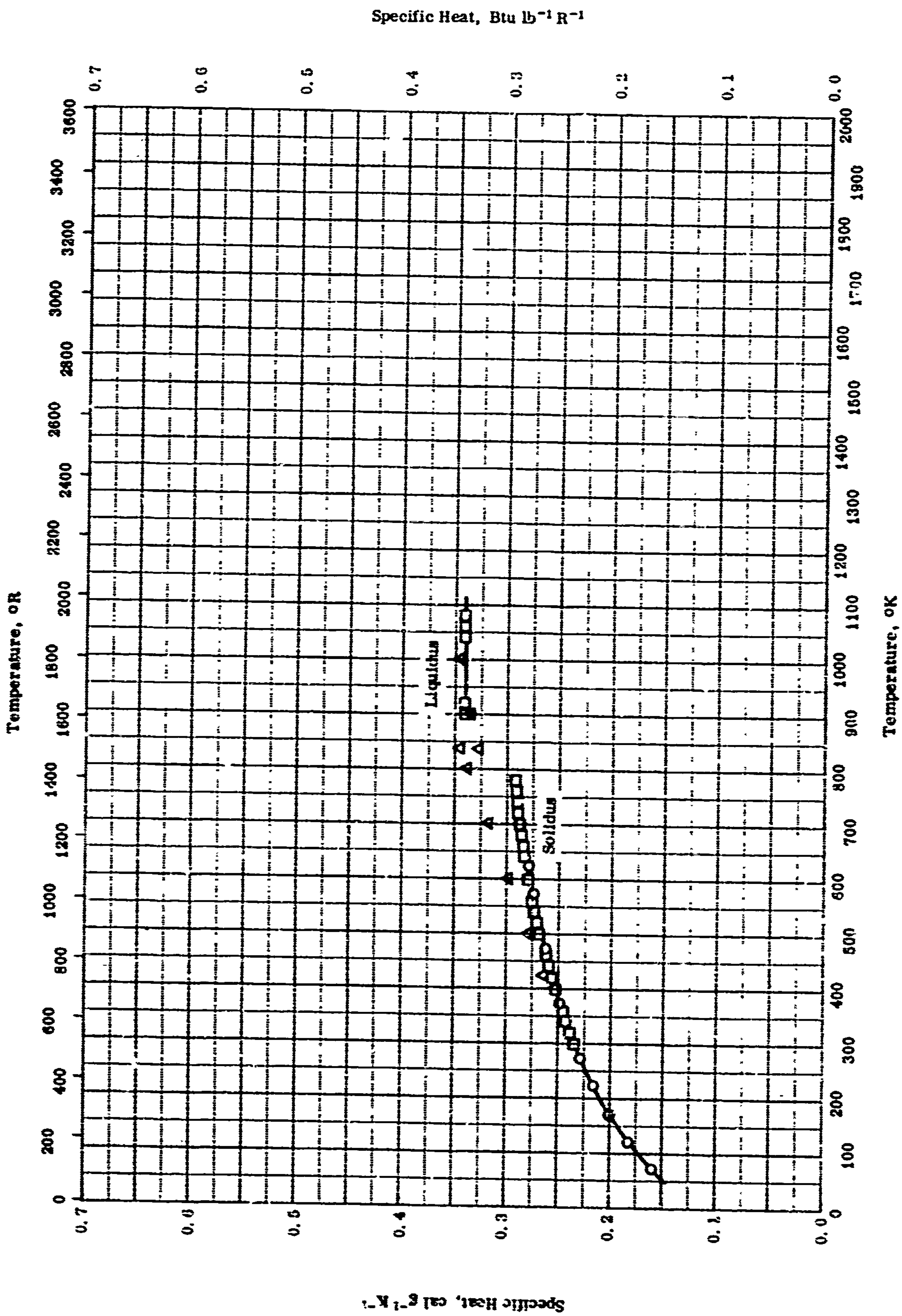
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	297-516		AZ 31A; 3.12 Al, 1.07 Zn, 0.49 Mn, 0.16 Ca, 0.01 > each Si, Sn, 0.0044 Fe, 0.001 Cu, 0.001 > Pb, and 0.0005 > Ni.	Cast; plotted curve is the average between "as fabricated" and solution heat treated specimens; max. deviation from average is ± 0.025 x 10^{-6} ohm cm.
□	57-18	293-533		Magnesium Alloy AZ31A and B; 95.5 Mg, 3.0 Al, 1.0 Zn, and 0.5 Mn.	Cast and wrought; in two conditions as fabricated and solution heat treated.
△	57-18	293-367		Magnesium Alloy AZ63A; 90.8 Mg, 6.0 Al, 3.0 Zn, and 0.2 Mn.	As fabricated.
●	57-18	293-367		Same as above.	Solution heat treated.
▽	57-18	293-367		Same as above.	Aged.
▷	57-18	293-367		Same as above.	Solution heat treated and aged.
◁	57-18	293-367		Magnesium Alloy AZ91C; 90.4 Mg, 8.7 Al, 0.7 Zn, and 0.2 Mn.	As fabricated.
●	57-18	293-367		Same as above.	Solution heat treated.
■	57-18	293-367		Same as above.	Solution heat treated and aged.
▲	57-18	293-367		Magnesium Alloy AZ92A; 88.8 Mg, 9.0 Al, 2.0 Zn, and 0.2 Mn.	As fabricated.
▼	57-18	293-367		Same as above.	Solution heat treated.
▼	57-18	293-367		Same as above.	Same data for 2 samples: sample (a) aged and sample (b) solution heat treated and aged.
▶	57-18	293		Magnesium Alloy AM 100A; 89.8 Mg, 10.0 Al, and 0.2 Mn.	Cast.

(Continued onto next page)

ELECTRICAL RESISTIVITY -- MAGNESIUM + ALUMINUM + ΣX_i (continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
⊙	57-18	293		Same as above.	Solution heat-treated.
◐	57-18	293		Same as above.	Solution heat-treated and aged.
⊖	57-18	293		Same as above.	Temper T61.
◇	40-1	368-644		Hydronalium - 71 (German Design.); nominal composition: 7 Al and 1 Si.	

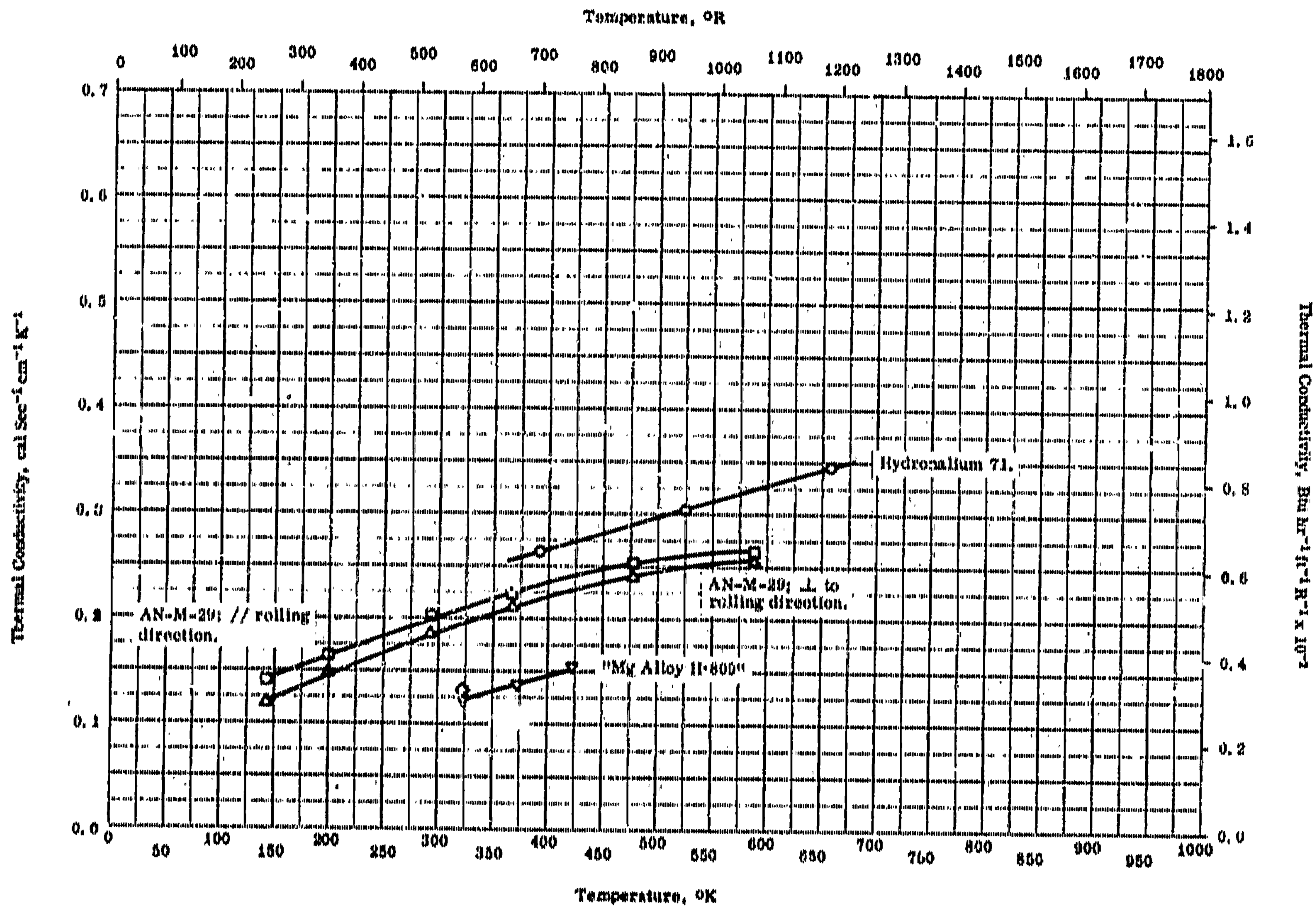


SPECIFIC HEAT -- MAGNESIUM + ALUMINUM + ΣX_i

SPECIFIC HEAT -- MAGNESIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1 also 54-13	173-590		AN-M-29; 95.7 Mg, 3.0 Al, 1.0 Zn, and 0.3 Mn; density 112 lb ft^{-3} at 32 F.	Annealed 1 hr at 600 F and furnace cooled; sealed under helium atmosphere.
□	61-18	280-1080	0.5-3	Magnesium alloy AZ-80; 8.0 Al, 0.55 Zn, and 0.14 Mn.	Under helium atmosphere.
△	57-18 also 56-17	425-838		Mg alloy AZ-31B; 95.5 Mg, 3.0 Al and 0.5 Mn.	Machined from permanent mold cast material.

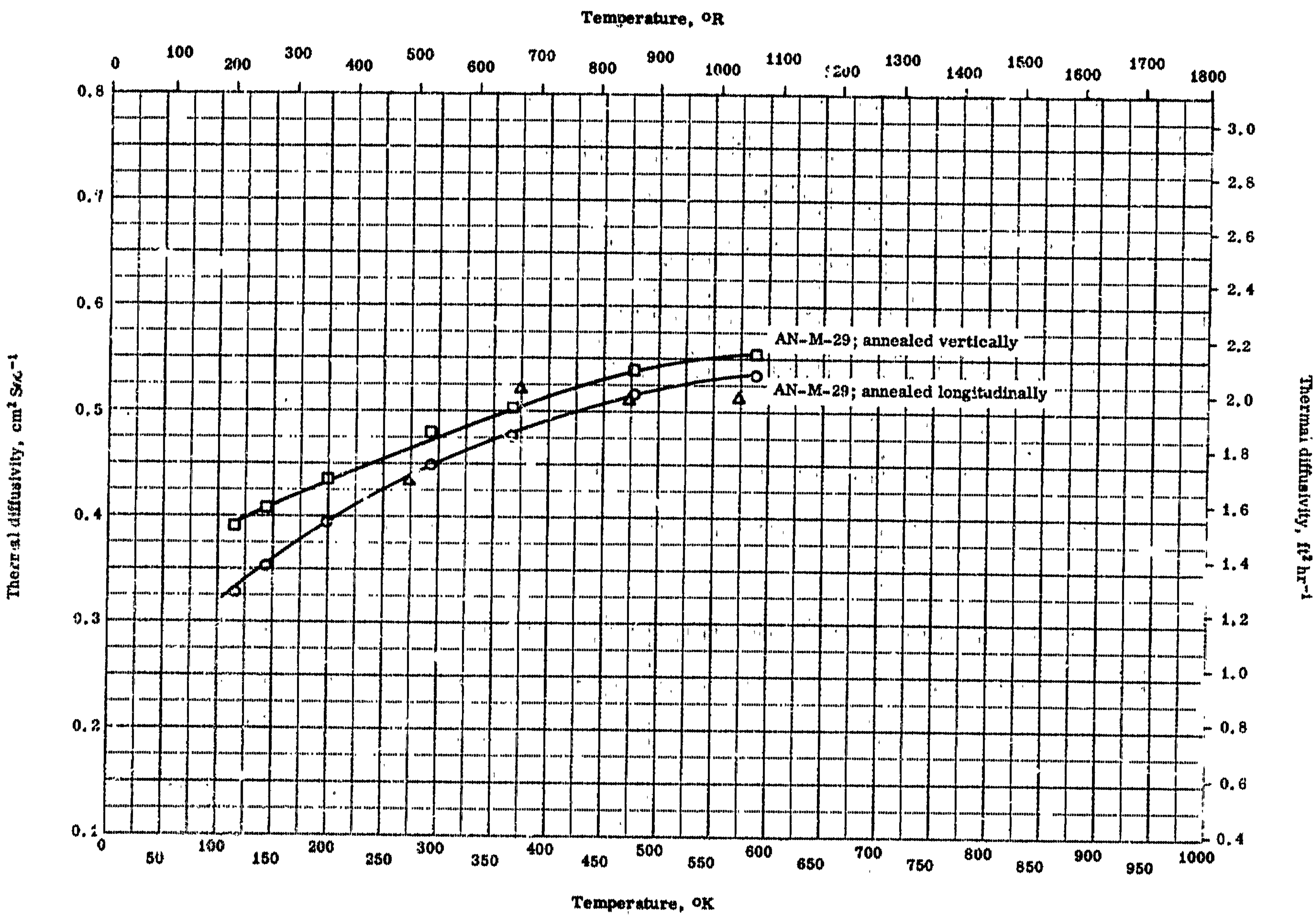


THERMAL CONDUCTIVITY -- MAGNESIUM + ALUMINUM + ΣX$_i$

THERMAL CONDUCTIVITY -- MAGNESIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	40-1	393-658		Hydronalium 71 (German design.); 92 Mg, 7 Al, and 1 Si; nominal composition.	Cast at 700 C into molds at 200 C, rolled and drawn, and then turned into rods; radiation less than 5%.
△	58-1	145-589		AN-M-29 (Dow Chem. Co.); 95.7 Mg, 3 Al, 1 Zn, and 0.3 Mn; density 111 lb ft^{-3}.	Annealed 1 hr at 1600 F and furnace cooled; measured parallel to the rolling direction.
□	58-1	145-589		Same as above.	Same as above except measured normal to rolling direction.
▽	64-3	323-423		H-609; 9 Al, 0.5 Zn and 0.3 Mn.	Sand-cast and solution treated
◇	64-3	323		Same as above.	Same as above; second run.

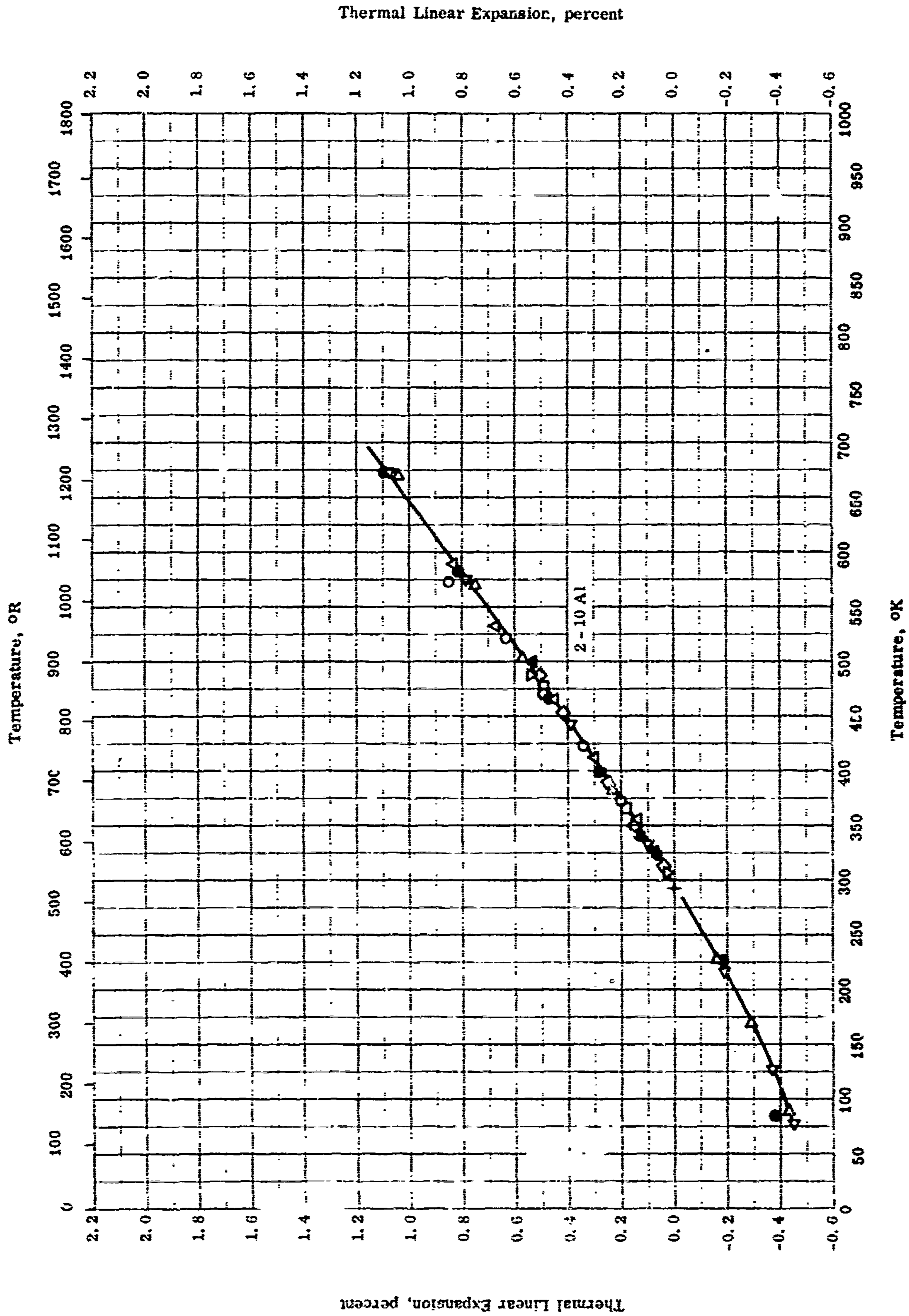


THERMAL DIFFUSIVITY -- MAGNESIUM + ALUMINUM + ΣX_i

THERMAL DIFFUSIVITY -- MAGNESIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	116-589		AN-M-29; 2.5-3.5 Al, 0.7-1.3 Zn, 0.3 max Si, 0.2 min Mn, 0.05 max Cu, 0.005 max Ni, and 0.005 max Fe, and 0.3 max others.	Hot rolled; annealed longitudinally at 315 C for 1 hr and furnace cooled.
□	58-1	116-589		Same as above	Same as above except annealed vertically.
△	56-1	273-573		AN-M-29; 3.5 Al, 1.3 Zn, 0.3 Si, 0.2 min Mn, 0.05 Cu, 0.005 Fe, and 0.005 Ni.	Annealed



THERMAL LINEAR EXPANSION -- MAGNESIUM + ALUMINUM + ΣX_i

THERMAL LINEAR EXPANSION -- MAGNESIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-29	373-573		6.02 Al, 3.10 Zn, 0.26 Mn, 0.017 Fe, 0.01 > each Ca, Si, Sn, 0.002 Cu, and 0.001 > each Ni, Pb.	Sample tested in the as fabricated condition; this composition fits a nominal Mg Alloy AZ63A.
□	54-19	293-478		Mg Alloy AZ81; nominal: 7.0 - 8.1 Al, 0.4 - 1.0 Zn, 0.3 max Si, 0.13 min Mn, 0.10 max each Cu, Ni, and 0.3 max others.	Cast; solution heat treated; expansion coefficient for AZ81 given as $(15.04 \pm 0.15) \times 10^{-6}$ F^{-1}.
▽	55-17	298-488		Mg Alloy AX81XA; 8.00 Al, 0.76 Zn, 0.21 Mn, 0.01 Si, 0.01 > each Ca, Sn, 0.003 Pb, 0.001 Fe, and 0.001 > each Cu, Ni.	Cast; solution heat treated.
◇	55-17	300-489		2 samples: a) AZ31A; 3.12 Al, 1.07 Zn, 0.49 Mn, 0.16 Ca, 0.01 > each Si, Sn, 0.0044 Fe, 0.001 Cu, 0.001 > Pb, 0.0005 > Ni. b) AZ31B; 3.14 Al, 1.05 Zn, 0.49 Mn, 0.01 > each Ca, Si, Sn, 0.0047 Fe, 0.001 > each Cu, Pb, and 0.0005 > Ni.	Plotted average of 4 samples, 2 conditions for each alloy, all within ±0.4%: a) as cast.) cast and solution heat treated.
△	55-17	300-589		Mg Alloy AZ63A; 6.02 Al, 3.10 Zn, 0.26 Mn, 0.017 Fe, 0.01 > each Si, Sn, Ca, 0.002 Cu, and 0.001 > each Ni, Pb.	Plotted average of 4 samples within ±2 %: a) as fabricated. b) aged. c) solution heat treated. d) solution heat treated and artificially aged.
▷	51-6 also 58-1	83-678		Mg Alloy AN-M-29; 2.5 - 3.5 Al, 0.7 - 1.3 Zn, 0.3 > Si, 0.2 > Mn, 0.05 > Cu, 0.005 > each Ni, Fe, and 0.03 > others.	Hot rolled, annealed 1 hr at 600 F, and furnace cooled; measured perpendicular to rolling direction in argon with heating rate at 1.5 - 2.5 C min^{-1}.

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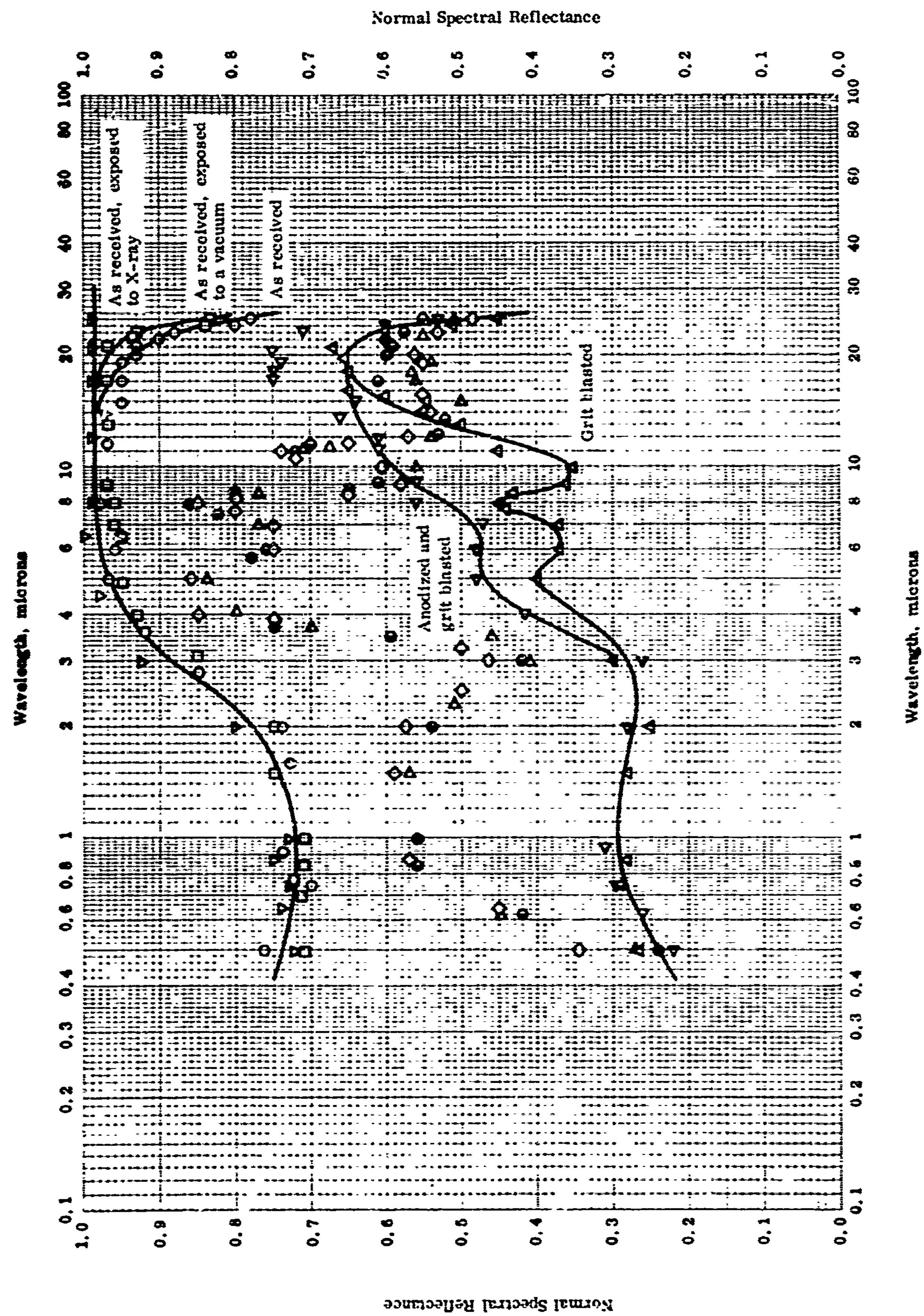
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◁	51-6 also 58-1	83-678		Same as above.	Same heat treatment as above; measured parallel to rolling direction.
●	51-6 also 58-1	83-678		Same as above.	Same heat treatment as above; measured across thickness of sheet.
▲	55-17	295-489		Mg Alloy AZ92A; nominal: 8.3 - 9.7 Al, 1.6 - 2.4 Zn, 0.10 < Mn, 0.3 > Si, 0.1 > Cu, 0.01 > Ni, and 0.3 > others.	Plotted average of 2 samples within ± 0.1%: a) cast and aged. b) cast, solution heat treated, and artificially aged.

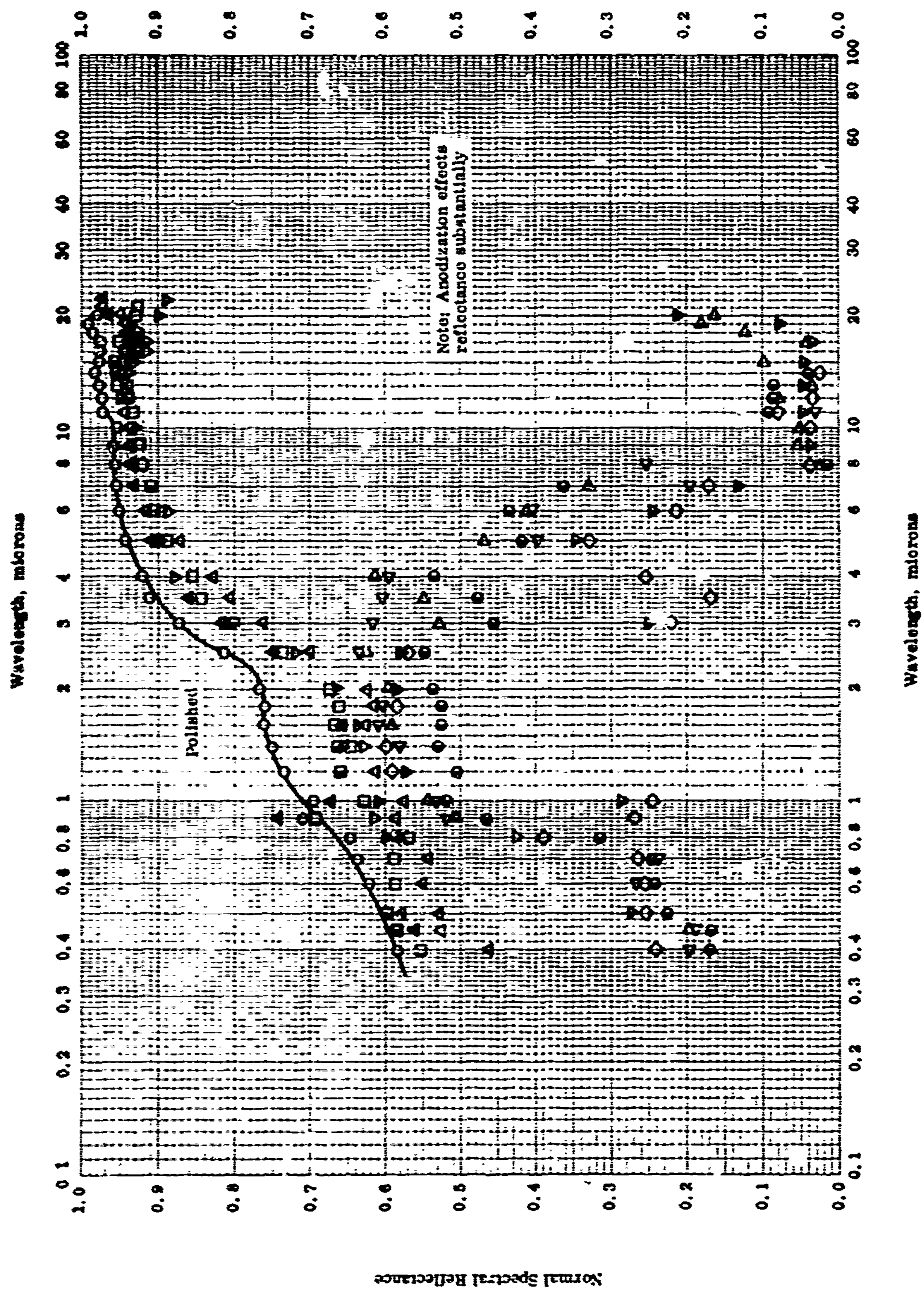


NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_1
(Mg alloy AZ31)

NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_i
(Mg alloy AZ31)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-23	298	0.50-25.0		MgAZ31; 3 Al, 1 Zn and 0.2 Mn.	As received.
△	62-23	298	0.50-25.0		Mg AZ31.	As received and grit-blasted.
□	62-23	298	0.50-25.0		Mg AZ31.	As received and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
▽	62-23	298	0.50-25.0		Mg AZ31.	As received and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg vacuum.
◇	62-23	298	0.50-25.0		Mg AZ31.	Anodized in HAE.
◁	62-23	298	0.50-25.0		Mg AZ31.	Anodized in HAE and grit-blasted.
▷	62-23	298	0.50-25.0		Mg AZ31.	Anodized in HAE and exposed to a vacuum of 4×10^{-8} mm Hg for 24 hrs.
◐	62-25	298	0.50-25.0		Mg AZ31.	Anodized in HAE and exposed to x-ray in a vacuum of 4×10^{-8} mm Hg for 24 hrs.

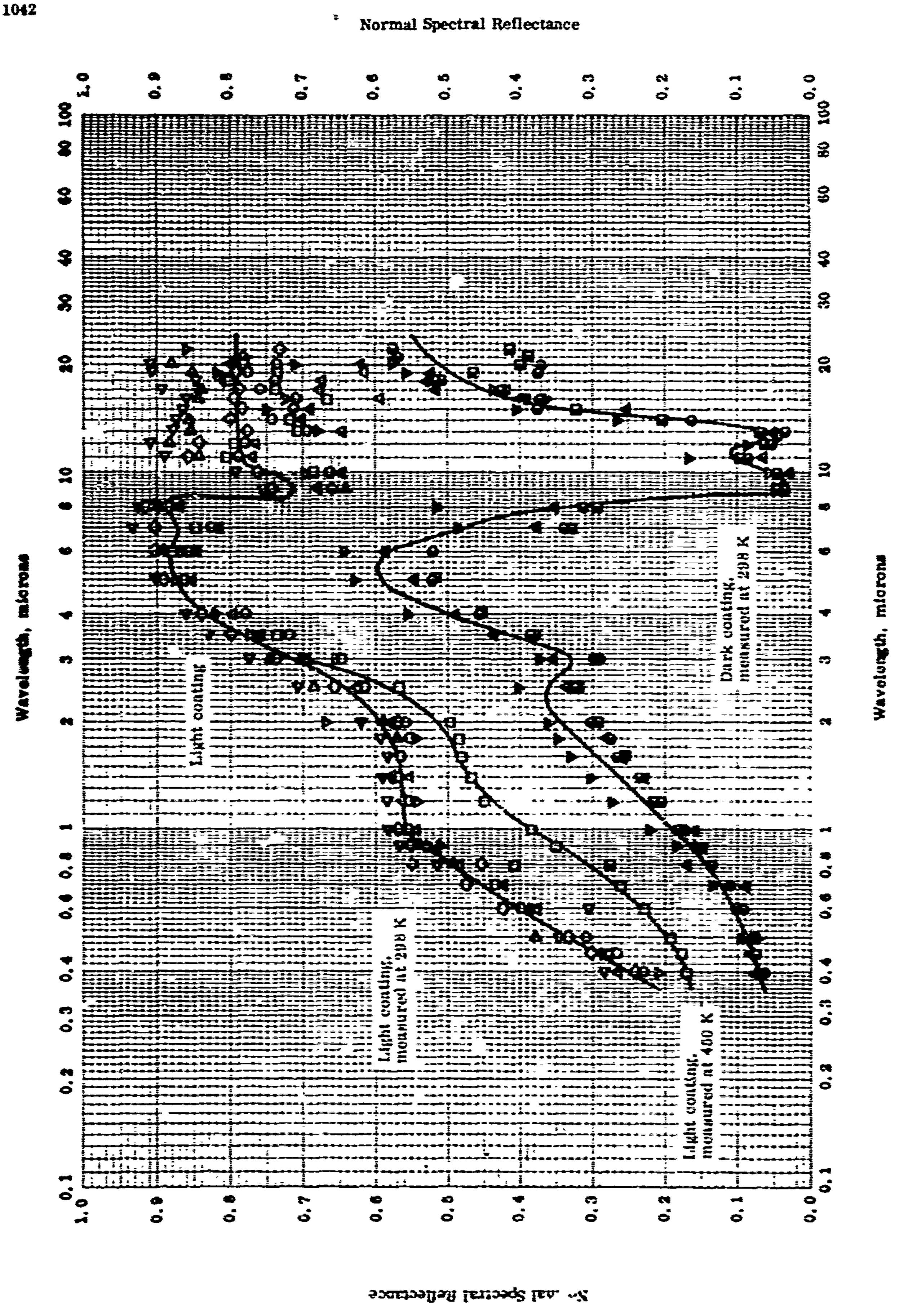


NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_i
(Mg AZ31B and MgAZ31B anodized in Dow 17)

NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_i
(Mg AZ31B and MgAZ31B anodized in Dow 17)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	61-22	298	0.4-20.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically polished; in 10^{-5} mm Hg vacuum.
△	61-22	298	0.4-21.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically and electropolished; anodized in Dow 17, light coating; in 10^{-5} mm Hg vacuum.
□	61-22	450	0.4-21.0		Same as above.	Same as above.
▽	61-22	298	0.4-22.0		Same as above.	Same as above.
◇	61-22	298	0.4-14.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically and electropolished; anodized in Dow 17, dark coating.
◁	61-22	450	0.4-11.0		Same as above.	Same as above.
▷	61-22	298	0.4-20.0		Same as above.	Same as above.
●	61-22	298	0.4-14.0		Same as above.	Same as above, after heating in air at 700 K.
▲	61-22	298	0.4-22.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically polished; anodized in Dow 17, light coating; in 10^{-5} mm Hg vacuum.
■	61-22	298	0.4-20.0		Same as above.	The above specimen mill finished, anodized in Dow 17, light coating; 10^{-5} mm Hg vacuum.
▼	61-22	298	0.4-20.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically polished, anodized in Dow 17, dark coating; in 10^{-5} mm Hg vacuum.



NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_i
(Mg Alloy - AZ 31B Anodized in HAE)

NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + ALUMINUM + ΣX_i
(Mg Alloy - AZ 31B Anodized in HAE)

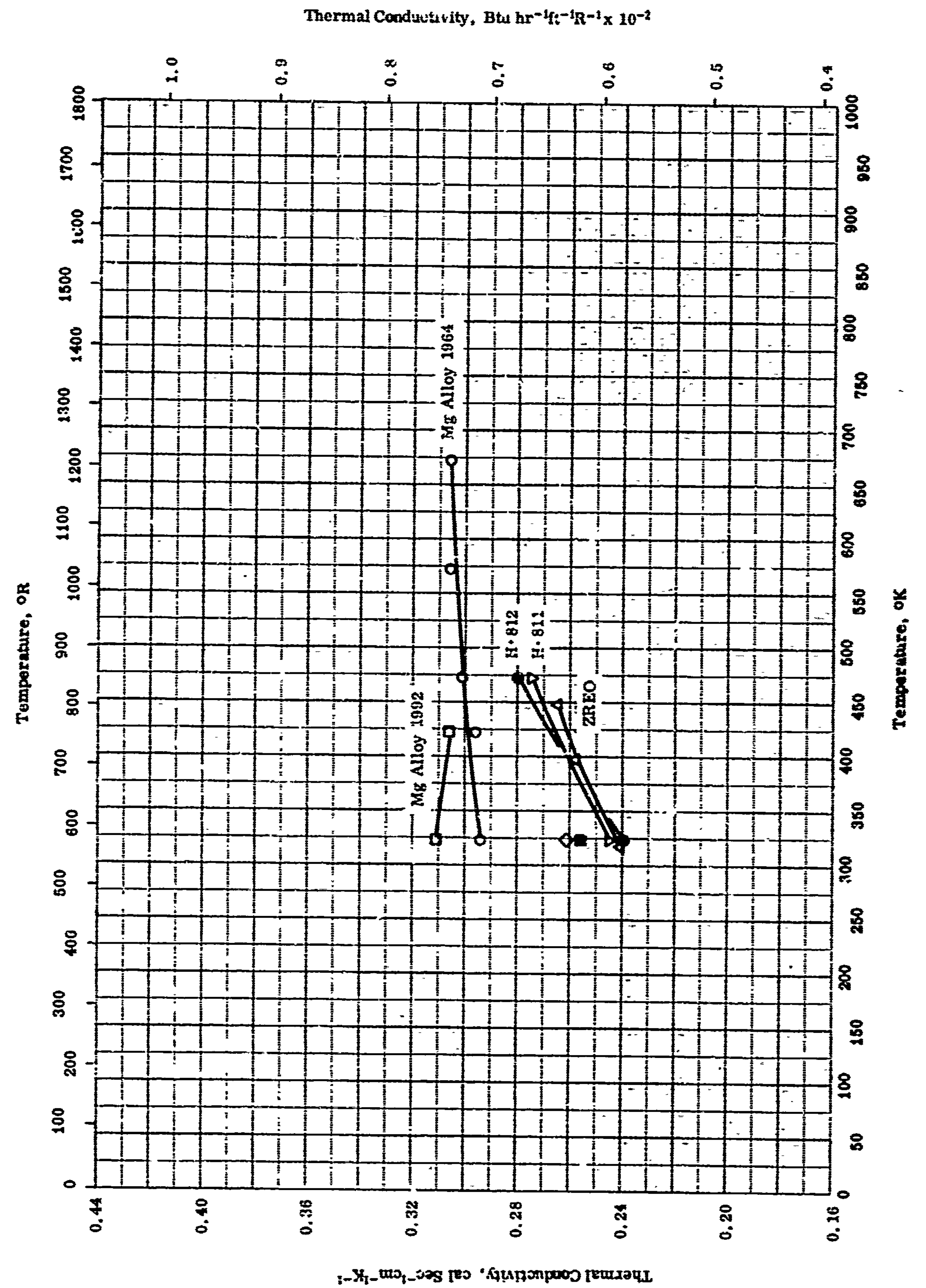
REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	61-22	298	0.4-20.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically and electropolished; anodized in HAE, light coating; measured in vacuum of 10^{-5} mm Hg.
△	61-22	450	0.4-20.0		Same as above.	Same as above.
□	61-22	298	0.4-20.0		Same as above.	The above specimen heated in air at 700 K for 30 min.
▽	61-22	298	0.4-22.0		Same as above.	The above specimen after previous high temperature run.
◇	61-22	298	0.4-22.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically and electropolished, anodized in HAE, light coating; in 10^{-5} mm Hg vacuum.
◁	61-22	298	0.4-22.0		95.5 Mg, 3 Al, 1 Zn and 0.45 Mn.	Mechanically polished, anodized in HAE, light coating, measured in vacuum of 10^{-5} mm Hg.
▷	61-22	298	0.4-20.0		Same as above.	The above specimen mill finished; anodized in HAE, light coating; measured in vacuum of 10^{-5} mm Hg.
●	61-22	298	0.4-22.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically polished, anodized in HAE, dark coating; measured in vacuum of 10^{-5} mm Hg.
▲	61-22	298	0.4-20.0		Same as above. (continued on to next page)	The above specimen heated in air at 700 K for 50 min.

NORMAL SPECTRAL REFLECTANCE — MAGNESIUM + ALUMINUM + ΣX_i (continued)
(Mg Alloy - AZ 31B Anodized in HAE)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
◧	61-22	298	0.4-22.0		Same as above.	The above specimen mill finished; anodized in HAE, dark coating; measured in vacuum 10^{-5} mm Hg.
▼	61-22	298	0.4-20.0		95.5 Mg, 3 Al, 1 Zn, and 0.45 Mn.	Mechanically and electropolished; anodized in HAE, dark coating, measured in vacuum of 10^{-5} mm Hg.



THERMAL CONDUCTIVITY -- MAGNESIUM + CERIUM + ΣX_i

THERMAL CONDUCTIVITY -- MAGNESIUM + CERIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	64-3	323-673		Mg Alloy 1964; 4.62 Ce, 2.02 Ce, and 0.75 Mn; Ce in form of mischmetal; Mg contained ≈0.033 Al and ≈0.012 Zn.	Machined.
□	64-3	323-423		Mg Alloy 1992; 4.46 Ce and 2.98 Ce; raw material same as above.	Machined.
△	64-3	318-448		ZREO; 2.75 Ce, 0.7 Zr, and 0.5 Zn; Ce in form of mischmetal.	Cast; heat treated 16 hrs at 180 C.
▽	64-3	323-473		H-811; 2.5 Ce, 2.5 Zn, and 0.7 Zr; Ce in form of mischmetal.	Sand-cast.
◇	64-3	323		Same as above.	Second run of above sample.
●	64-3	323-473		H-812; 3 Ce and 0.7 Zr; Ce in form of mischmetal.	Sand-cast.
■	64-3	323		Same as above.	Second run of above sample.

PROPERTIES OF MAGNESIUM + THORIUM + ΣX_i

REPORTED VALUES

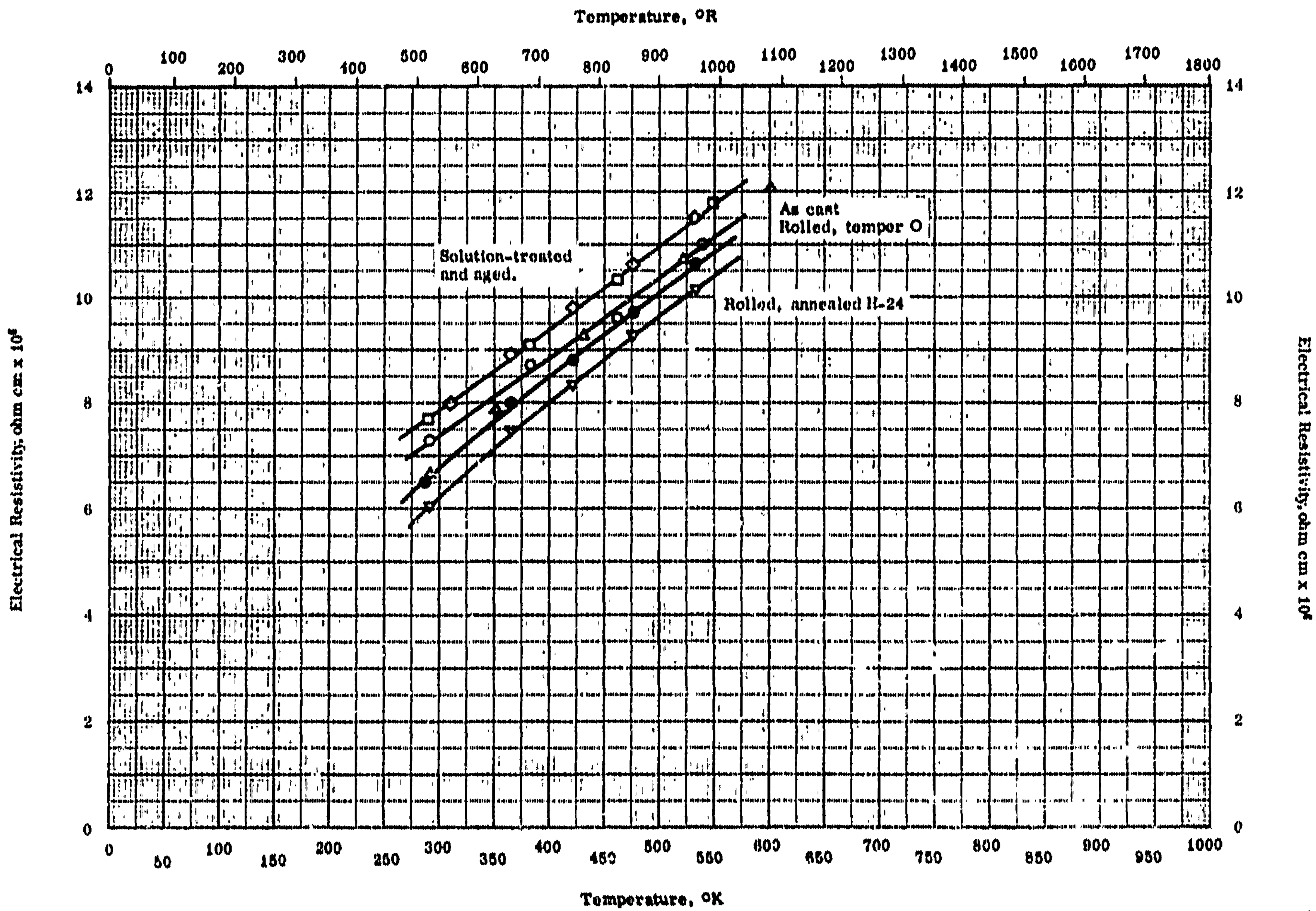
Melting Point:	K	R
○ 3.0 Th and 0.7 Zr	861	1550
▽ 2.0 Th and 0.5 Mn	878	1580

Heat of Fusion:	cal g^{-1}	Btu lb^{-1}
● 3.0 Th and 0.7 Zr	78 ± 2	140 ± 4
▼ 2.0 Th and 0.5 Mn	82 ± 2	148 ± 4

PROPERTIES OF MAGNESIUM + THORIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-18	861		Mg Alloy HK 31A; 3.0 Th, 0.7 Zr, 0.08 > Mn, 0.03 > Al, 0.02 > Zn, 0.01 > each Ca, Si, and Sn, 0.006 ≥ Fe, 0.005 > Cu, and 0.001 > Ni and Pb.	
●	57-18	861		Same as above.	
▽	57-18	878		Mg Alloy HM 21 XA; 2.0 Th, 0.5 Mn, 0.03 > Al, 0.02 ≥ Fe, 0.01 > each Si, Sn, and Ca, 0.005 > Cu, and 0.00 .> each Ni and Pb.	
▼	57-18	878		Same as above.	

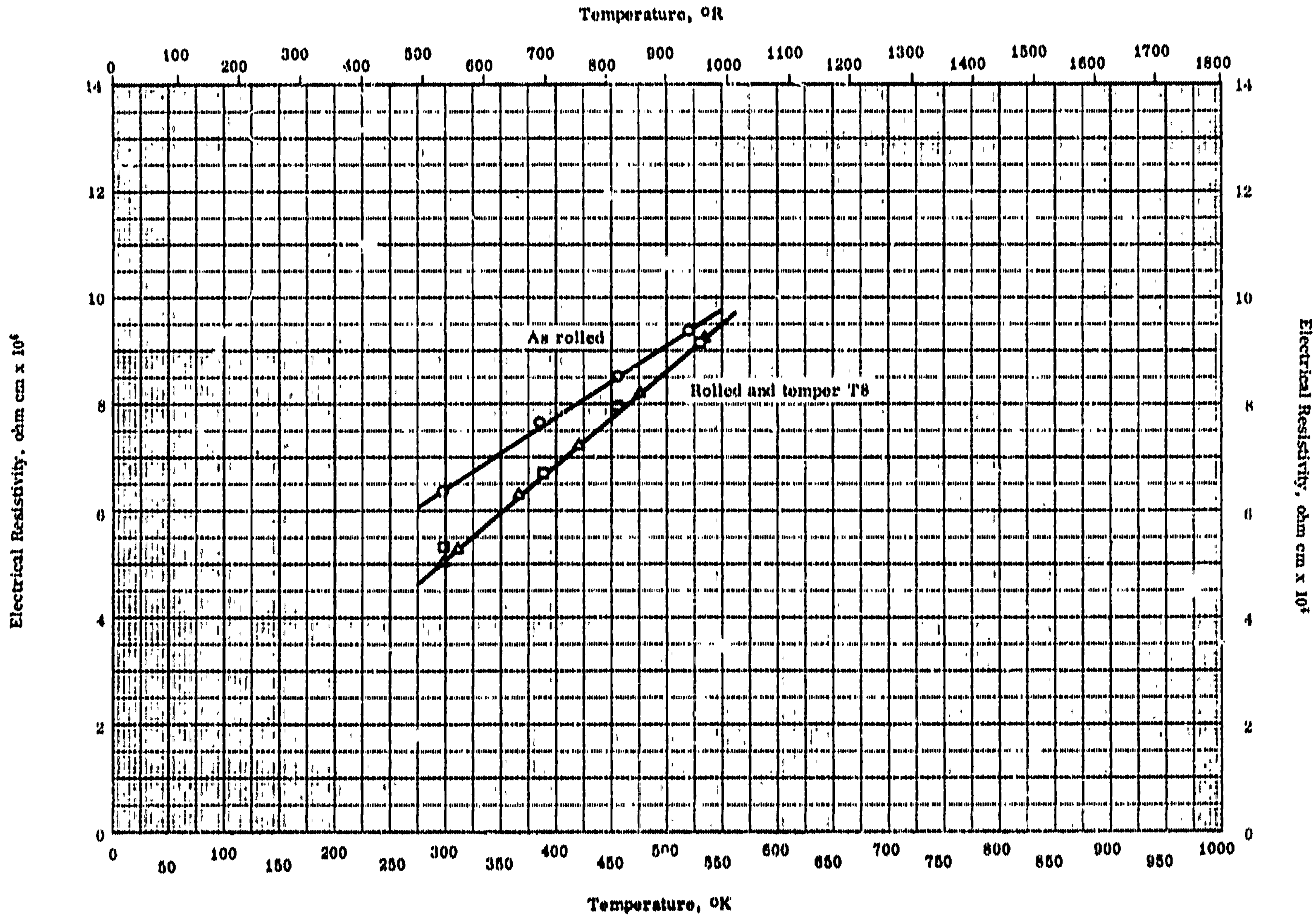


ELECTRICAL RESISTIVITY -- MAGNESIUM + THORIUM + ΣX_i
(Alloy HK-31)

ELECTRICAL RESISTIVITY — MAGNESIUM + THORIUM + ΣX_i
(Alloy HK-31)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	297-540		Mg alloy HK 31XA; 3.16 Th, 0.71 Zr, 0.054 Mn, 0.03 > Al 0.02 Zn, 0.01 > each Ca, Si, Sn, 0.005 > Cu, 0.002 Fe, and 0.001 > each Ni, Pb.	As cast; plotted points show average (within 2.8%) of 2 samples.
□	56-20	297-548		Same as above.	Solution heat treated with and without aging; plotted points show average (within 0.5%) of 3 samples.
△	56-20	293-601		Mg alloy HK 31XA; 2.77 Th, 0.62 Zr, 0.032 Mn, 0.03 > Al, 0.02 > Zn, 0.01 > each Ca, Si, Sn, 0.003 > Cu, 0.001 Fe, and 0.001 > each Ni, Pb.	Rolled sheet; annealed to H-24 condition.
◇	57-18	293-533		Magnesium alloy HK 31 A; 96.3 Mg, 3.0 Th, and 0.7 Zr.	Cast, solution heat-treated, and aged.
▽	57-18	293-533		Same as above.	Rolled; temper H-24.
●	57-18	293-533		Same as above.	Rolled; temper O.

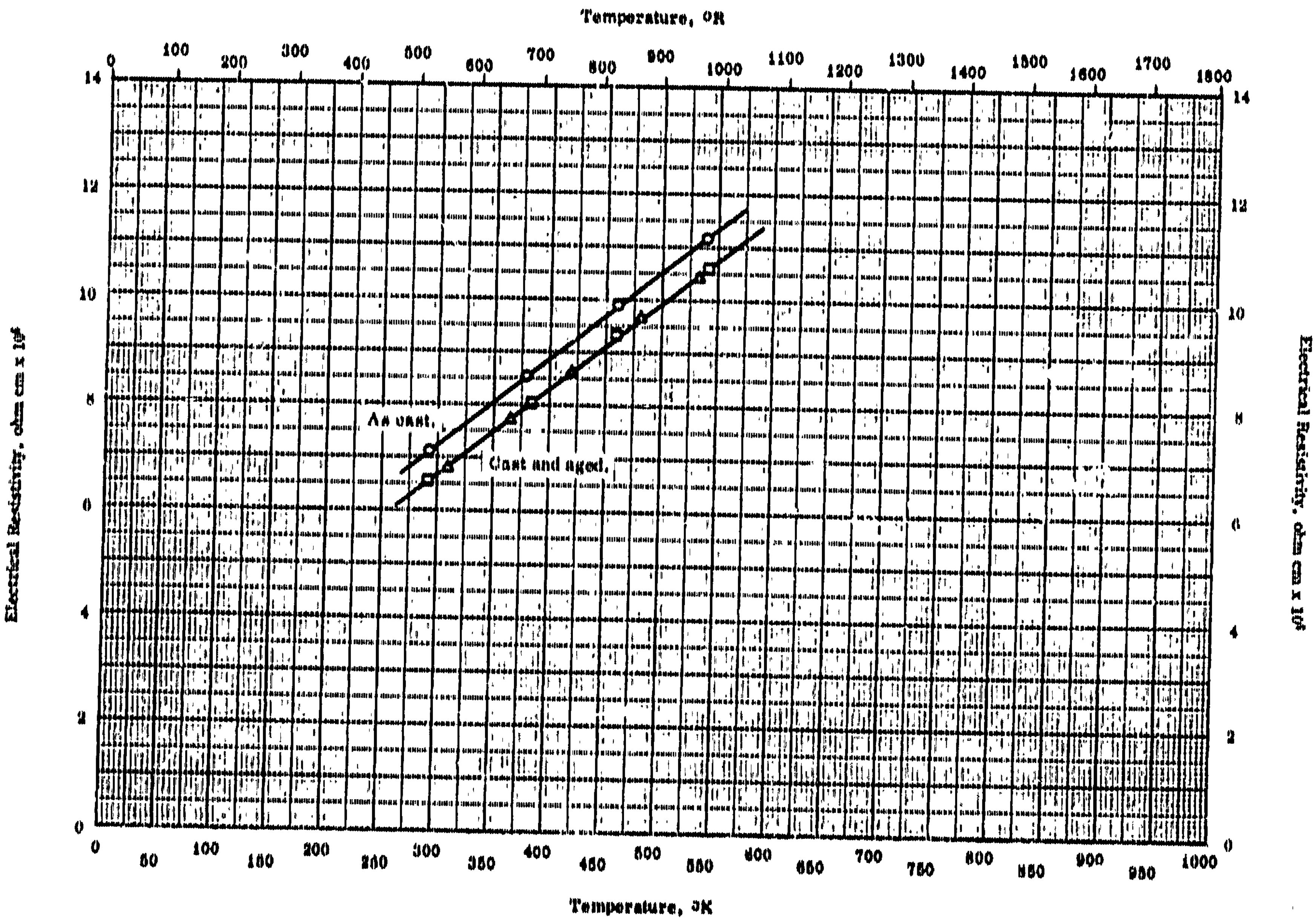


ELECTRICAL RESISTIVITY -- MAGNESIUM + THORIUM + ΣX_i
(Alloy HM-21XA)

ELECTRICAL RESISTIVITY -- MAGNESIUM + THORIUM + ΣX_i
(Alloy HM-21XA)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	298-521		Mg alloy HM-21XA: 2.22 Th, 0.59 Mn, 0.03 > Al, 0.021 Fe, 0.02 > Zn, 0.01 > each Ca, Sn, 0.005 > Cu, 0.001 > each Pb, Si, and 0.0005 > Ni.	Rolled sheet as fabricated; plotted pts. show average values (within 1.5%) of 6 samples.
□	56-20	297-531		Same as above.	Rolled sheet, hard annealed; plotted pts. show average (within 0.55%) of 4 samples.
△	57-18	293-533		Magnesium alloy HM-21XA: 97.5 Mg, 2.0 Th, and 0.5 Mn.	Rolled; temper T8.

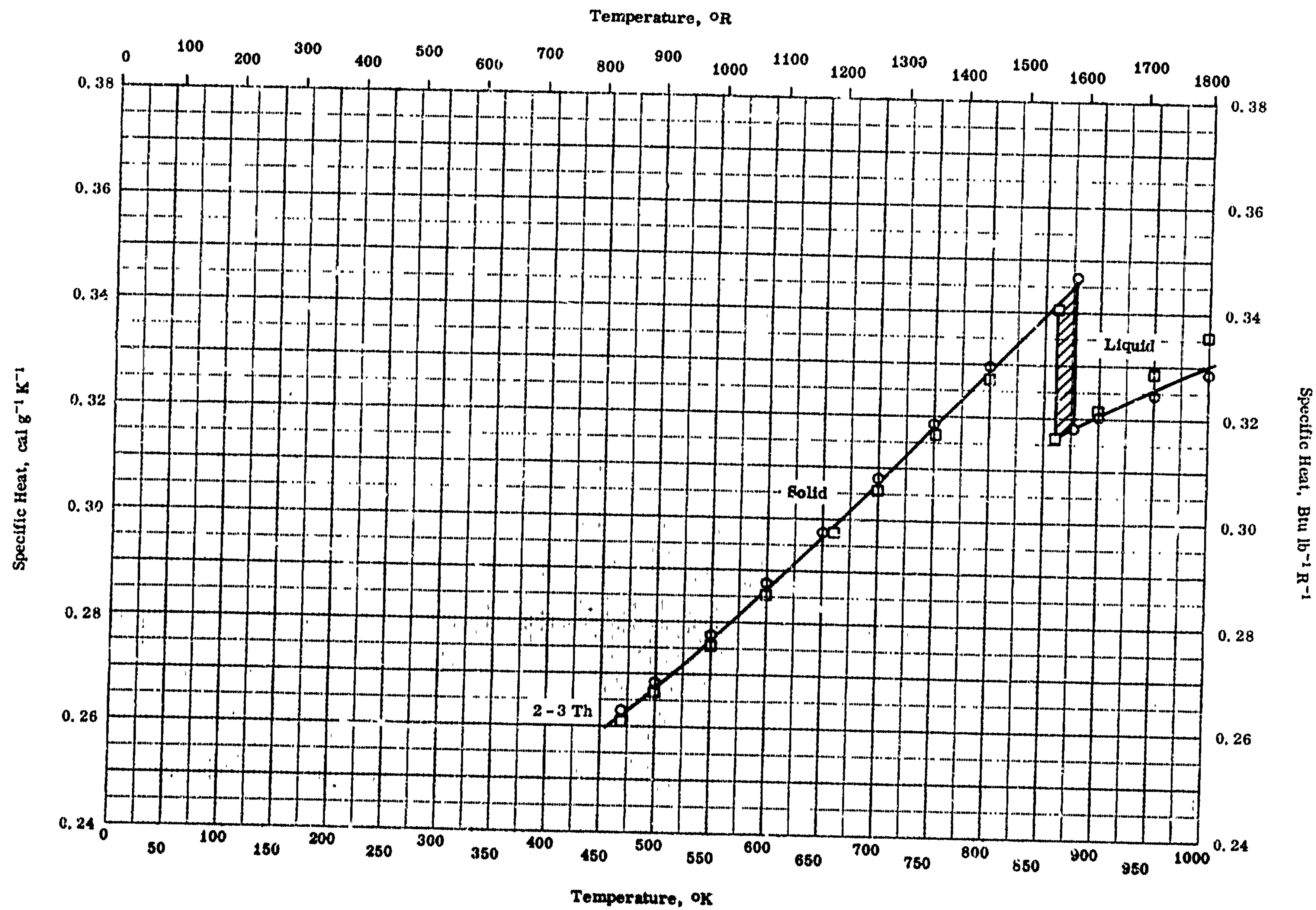


ELECTRICAL RESISTIVITY -- MAGNESIUM + THORIUM + ΣX_i
(Alloy HZ-32XA)

ELECTRICAL RESISTIVITY -- MAGNESIUM + THORIUM + ΣX_i
(Alloy HZ-32XA)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	297-540		Alloy HZ-32XA; 3.04 Th, 2.11 Zn, 0.77 Zr, 0.049 Mn, 0.03 >Al, 0.01 > each Ca, Si, Sn, 0.005 > Cu, 0.002 > Fe, and 0.001 > each Ni, Pb.	As cast; plotted points show average (within 1%) of 2 samples.
□	56-20	297-544		Same as above.	Cast and aged, plotted points show average (within 1%) of 2 samples.
△	57-18	293-333		Magnesium Alloy HZ32A; 94.2 Mg, 3.0 Th, 2.1 Zn, and 0.7 Zr.	Cast; temper T5 aged.

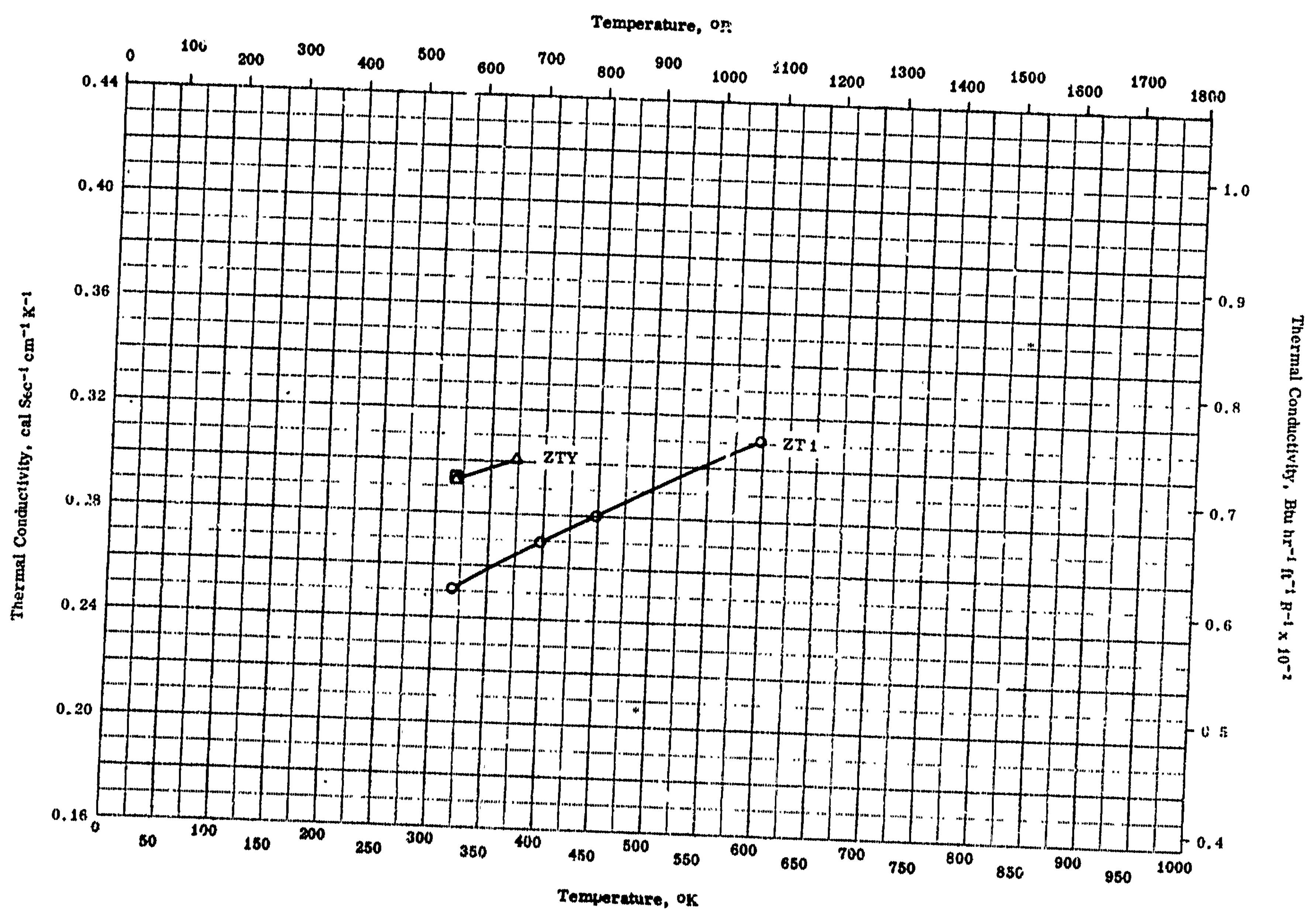


SPECIFIC HEAT -- MAGNESIUM + THORIUM + ΣX_i

SPECIFIC HEAT -- MAGNESIUM + THORIUM + ΣX_i

REFERENCE IN ORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-18 also 55-17	470-878		Mg alloy HM21XA; 2.0 Th and 0.5 Mn	
□	57-18 also 55-17	470-878		Mg alloy HK31A; 96.3 Mg, 3.0 Th, and 0.7 Zr.	

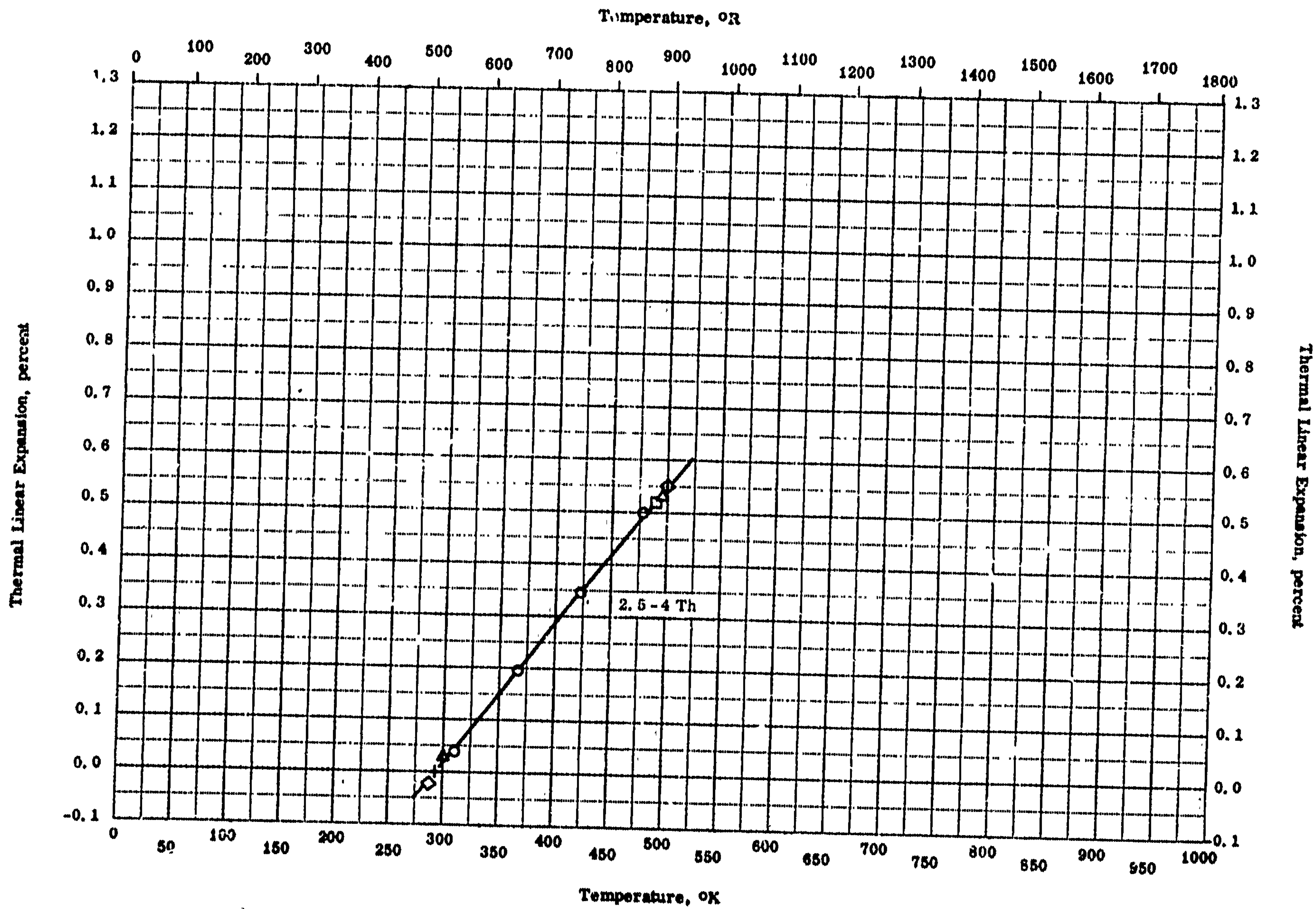


THERMAL CONDUCTIVITY — MAGNESIUM + THORIUM + ΣX_i

THERMAL CONDUCTIVITY -- MAGNESIUM + THORIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	64-3	318-598		ZTI; 3.0 Th, 2.3 Zn, and 0.7 Zr.	Cast and heat treated 16 hrs at 315 C.
□	64-3	318		Same as above.	The above sample measured after heated to 380 C.
△	64-3	318-373		ZTY; 0.75 Th, 0.6 Zr, and 0.5 Zn.	Extruded.

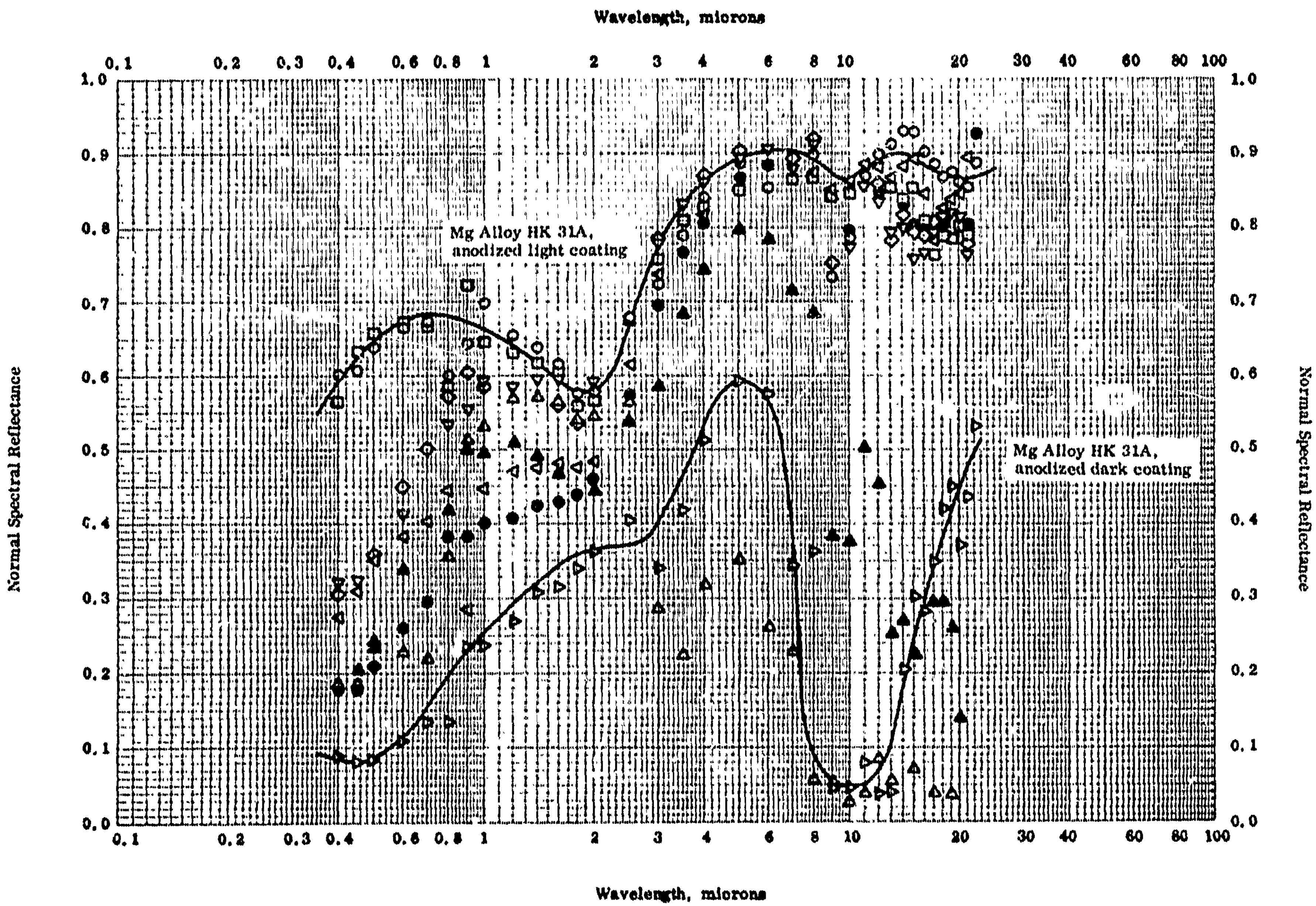


THERMAL LINEAR EXPANSION -- MAGNESIUM + THORIUM + ΣX_i

THERMAL LINEAR EXPANSION -- MAGNESIUM + THORIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-19	293-478		Mg Alloy HK31; nominal: 2.5-4.0 Th, 0.5-1.0 Zr, and 0.3 others.	Cast; solution heat-treated and aged; expansion coefficient for HK31 given as (14.84 ± 0.12) x 10^{-6} F^{-1}
□	55-17	298-488		Mg Alloy HZ32XA; 3.04 Th, 2.11 Zn, 0.77 Zr, 0.049 Mn, 0.03> Al, 0.01> each Ca, Si, Sn, 0.005> Cu, 0.002 Fe, 0.001> each Ni, Pb.	Cast, solution heat treated, and artificially aged.
△	55-17	298-488		Same as above.	Cast and aged.
◇	55-17	298-488		Mg Alloy HK31XA; 3.16 Th, 0.71 Zr, 0.054 Mn, 0.03> Al, 0.02> Zn, 0.01> each Ca, Si, Sn, 0.005> Cu, 0.002 Fe, and 0.001> each Ni, Pb.	Cast, solution heat treated, and artificially aged.



NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + THORIUM + ΣX_i
(Mg Alloy HK 31A)

NORMAL SPECTRAL REFLECTANCE -- MAGNESIUM + THORIUM + ΣX_i
(Mg Alloy HK 31A)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	61-22	298	0.4-22.0		96 Mg, 3.3 Th, and 0.7 Zn.	Mechanically polished; anodized in Dow 17, light coating; 10^{-5} mm Hg vacuum.
△	61-22	298	0.4-19.0		96 Mg, 3.3 Th, and 0.7 Zn.	Same treatment as above except with dark coating; 10^{-5} mm Hg vacuum.
□	61-22	298	0.4-21.0		96 Mg, 3.3 Th, and 0.7 Zn.	Mechanically polished; anodized in Dow 17, light coating; 10^{-5} mm Hg vacuum.
◁	61-22	298	0.4-21.0		Same as above.	The above specimen heated in air at 700 K for 30 min.; 10^{-5} mm Hg vacuum.
▷	61-22	298	0.4-22.0		96 Mg, 3.3 Th, and 0.7 Zn.	Mechanically polished; anodized in HAE, dark coating; 10^{-5} mm Hg vacuum.
▽	61-22	450	0.4-21.0		96 Mg, 3.3 Th, and 0.7 Zn.	Same treatment as above.
◇	61-22	298	0.4-21.0		Same as above.	The above specimen measured at 298 K again.
●	61-22	298	0.4-22.0		Same as above.	The above specimen heated in air at 700 K for 30 min.
▲	61-22	298	0.4-20.0		96 Mg, 3.3 Th, and 0.7 Zn.	Mechanically and electropolished; anodized in HAE, light coating; 10^{-5} mm Hg vacuum.

PROPERTIES OF MAGNESIUM + ZINC + ΣX_i

REPORTED VALUES

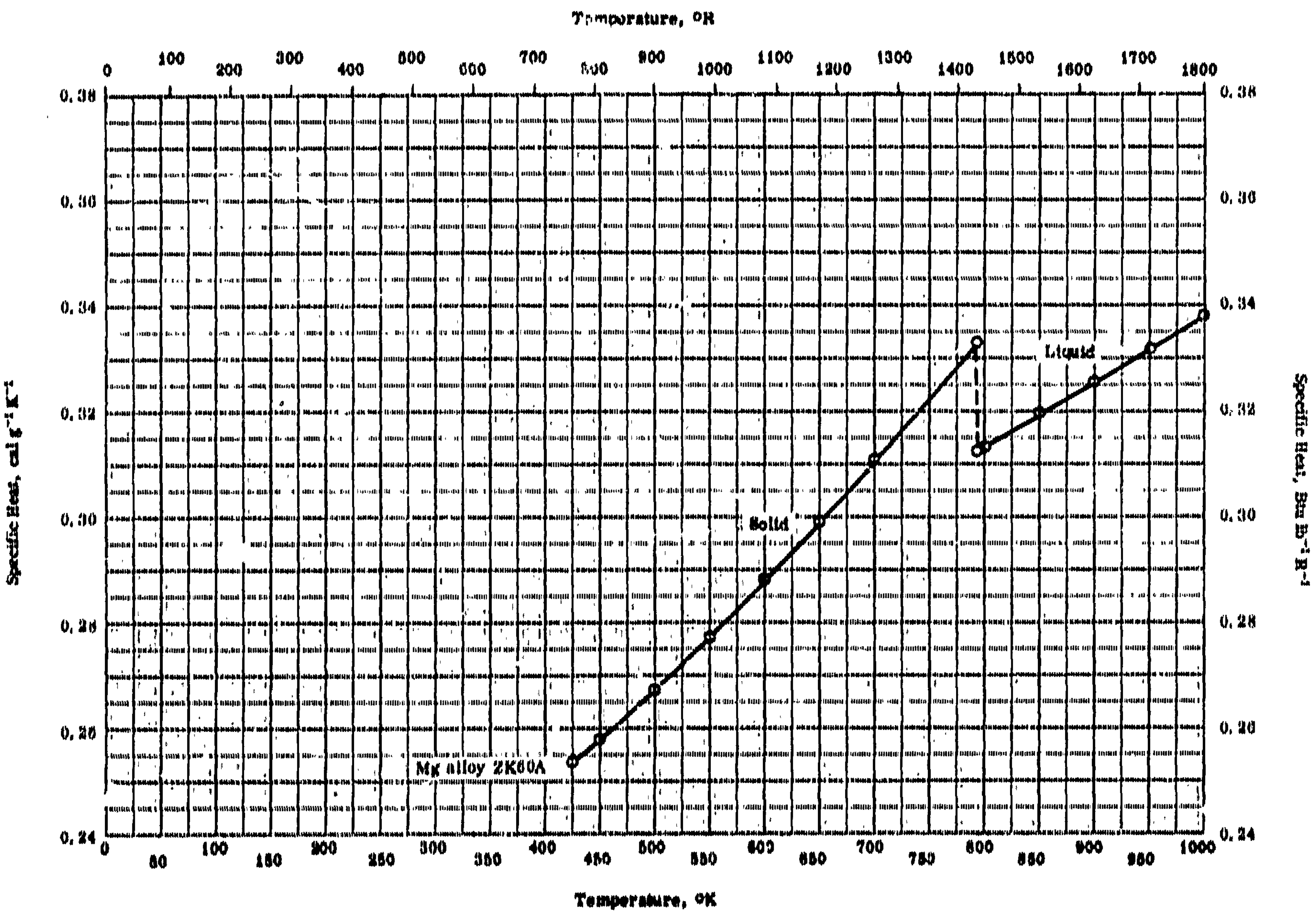
Melting Point:	K	R
○ 5.39 Zn and 0.6 misch-metals	733	1320
□ 6.31 Zn and 1.16 misch-metals	753	1355
△ 6.31 Zn and 1.70 misch-metals	768	1382
▽ 6.26 Zn and 2.23 misch-metals	778	1400
◁ 6.31 Zn and 3.28 misch-metals	789	1420
▷ 6.29 Zn and 5.34 misch-metals	800	1440
◇ 6.22 Zn and 7.32 misch-metals	800	1440
● 5.78 Zn and 0.74 Zr	793	1427

Heat of Fusion:	cal g^{-1}	Btu lb^{-1}
■ 5.78 Zn and 0.74 Zr	76 ± 4	137 ± 7

PROPERTIES OF MAGNESIUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-10	733		93.01 Mg, 6.39 Zn, and 0.60 mischmetals (approx. 50 Ce and 50 La).	M.P. metallographic inspection for signs of chilled liquid in sample quenched from various temperature levels.
□	54-10	763		92.53 Mg, 6.31 Zn, and 1.16 mischmetals.	Same as above.
△	54-10	768		91.99 Mg, 6.31 Zn, and 1.70 mischmetals .	Same as above.
▽	54-10	778		91.51 Mg, 6.26 Zn, and 2.23 mischmetals.	Same as above.
◁	54-10	780		90.41 Mg, 6.31 Zn, and 3.28 mischmetals.	Same as above.
▷	54-10	800		88.37 Mg, 6.29 Zn, and 5.34 mischmetals.	Same as above.
◇	54-10	800		86.40 Mg, 6.22 Zn, and 7.32 mischmetals.	Same as above.
●	57-18	793		Alloy ZK 60; 93.40 Mg, 5.78 Zn, 0.74 Zr, 0.05 Mn, and 0.03 Al.	
■	57-18	793		Same as above.	ΔH_f by difference of liquid and solid enthalpies at M.P.

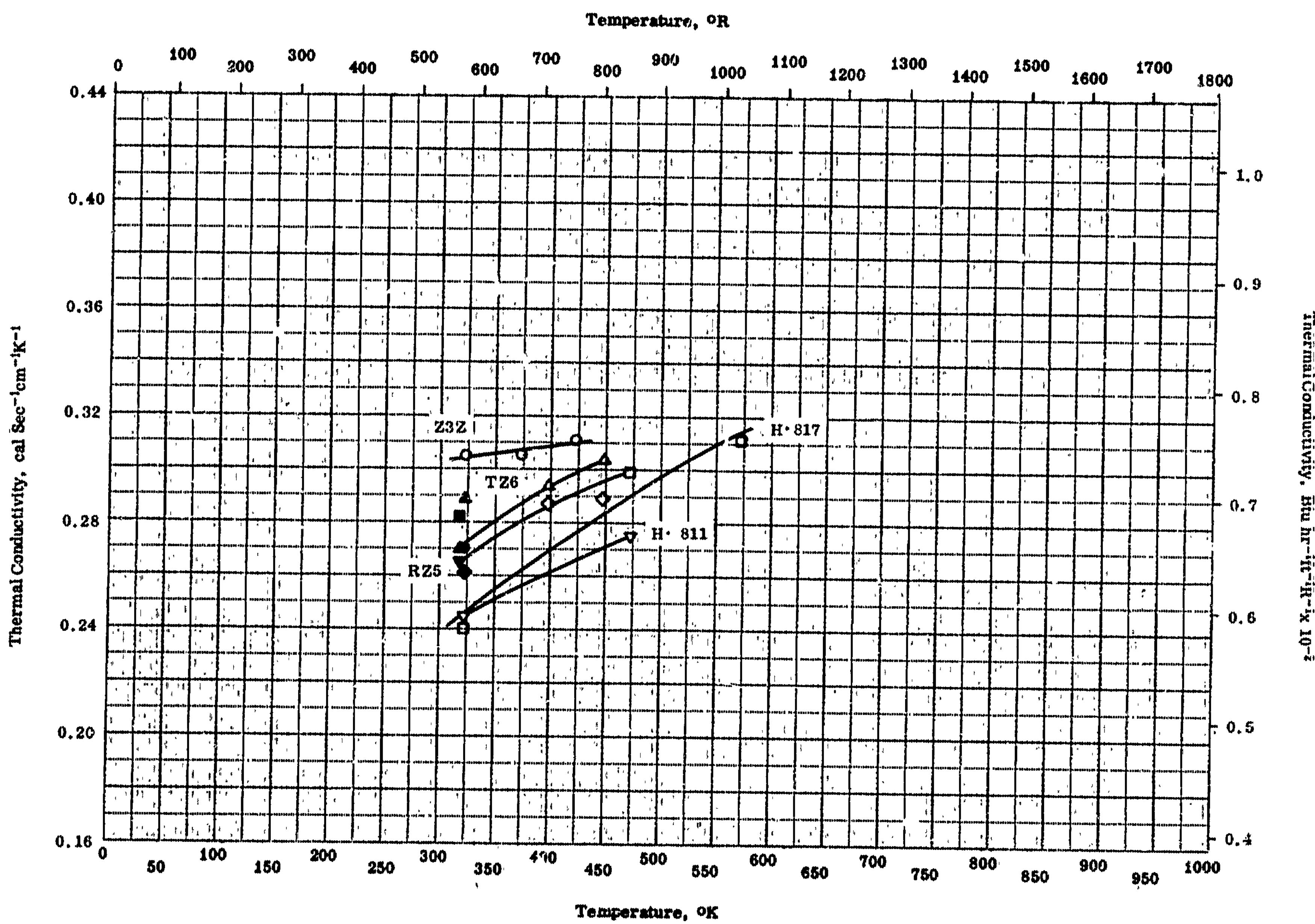


SPECIFIC HEAT -- MAGNESIUM + ZINC + ΣX$_i$

SPECIFIC HEAT -- MAGNESIUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	57-18 also 55-17	236-4[illegible]		Mg alloy ZK60A; 5.78 Zn, 0.74 Zr, 0.[illegible]5 Mn, and 0.03 Al.	

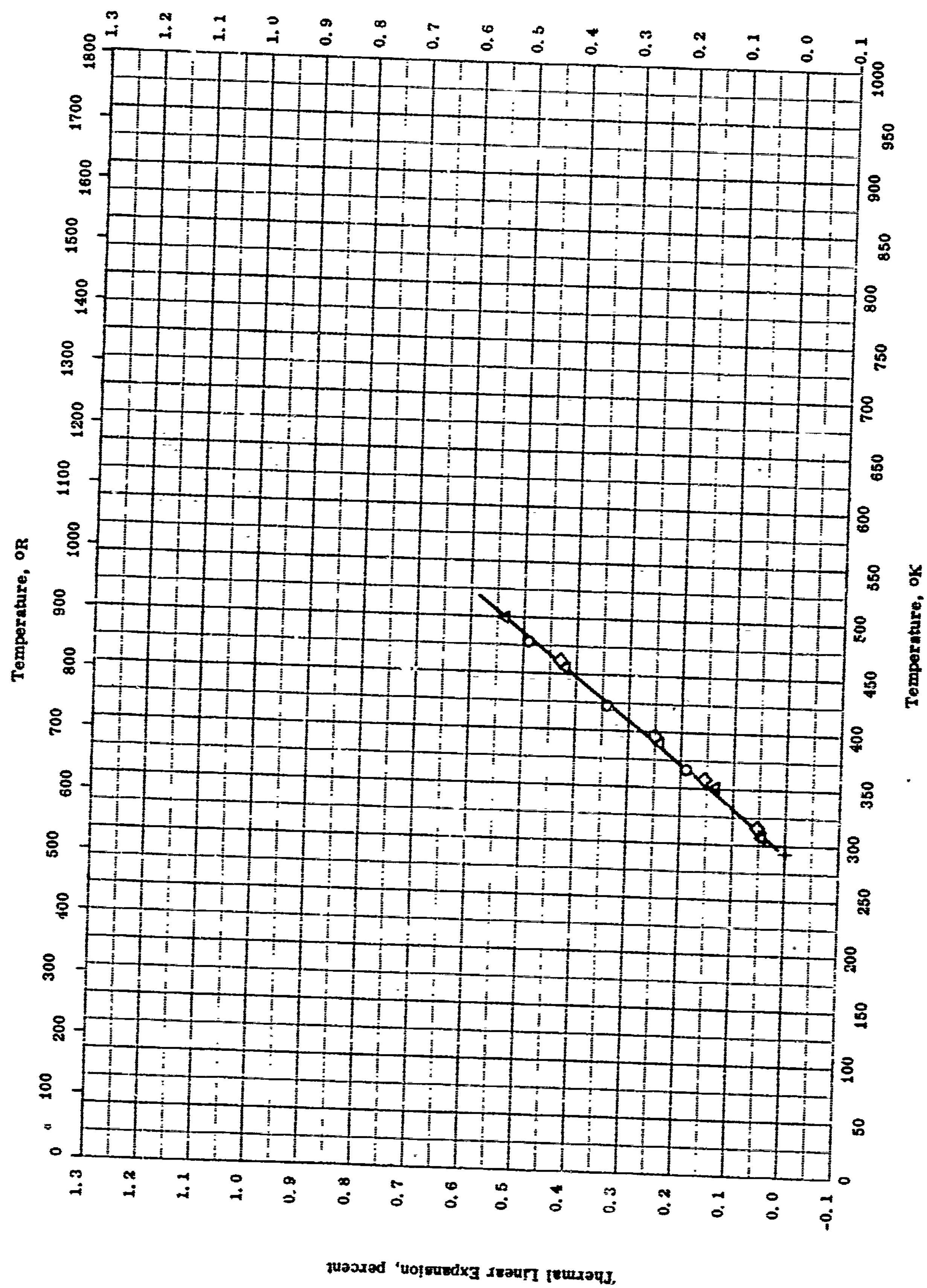


THERMAL CONDUCTIVITY -- MAGNESIUM + ZINC + ΣX_1

THERMAL CONDUCTIVITY -- MAGNESIUM + ZINC + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
●	64-3	323		H-807; 4.5 Zn and 0.7 Zr.	Sand-cast and annealed.
□	64-3	323-573		H-817; 4.5 Zn, 2 Ce, and 0.7 Zr; Ce in form of mischmetal.	Sand-cast and annealed.
▲	64-3	323		Same as above.	Second run of above sample.
▽	64-3	323-473		H-811; 2.5 Zn, 2.5 Ce, and 0.7 Zr; Ce in form of mischmetal.	Sand-cast.
◆	64-3	323		Same as above.	Second run of above sample.
○	64-3	323-423		Z3Z; 3 Zn and 0.7 Zr.	Extruded.
△	64-3	318-448		TZ6; 5.75 Zn, 1.5 Th, and 0.7 Zr.	Cast; heat treated 2 hrs at 330 C and 16 hrs at 180 C.
■	64-3	318		Same as above.	Same as above except heat treated again at 205 C.
◇	64-3	318-448		RZ5; 4.0 Zn, 1.2 Ce, and 0.7 Zr; Ce in form of mischmetal.	Cast; heat treated 2 hrs at 330 C and 16 hrs at 180 C.
▼	64-3	318		Same as above.	Second run of above sample.

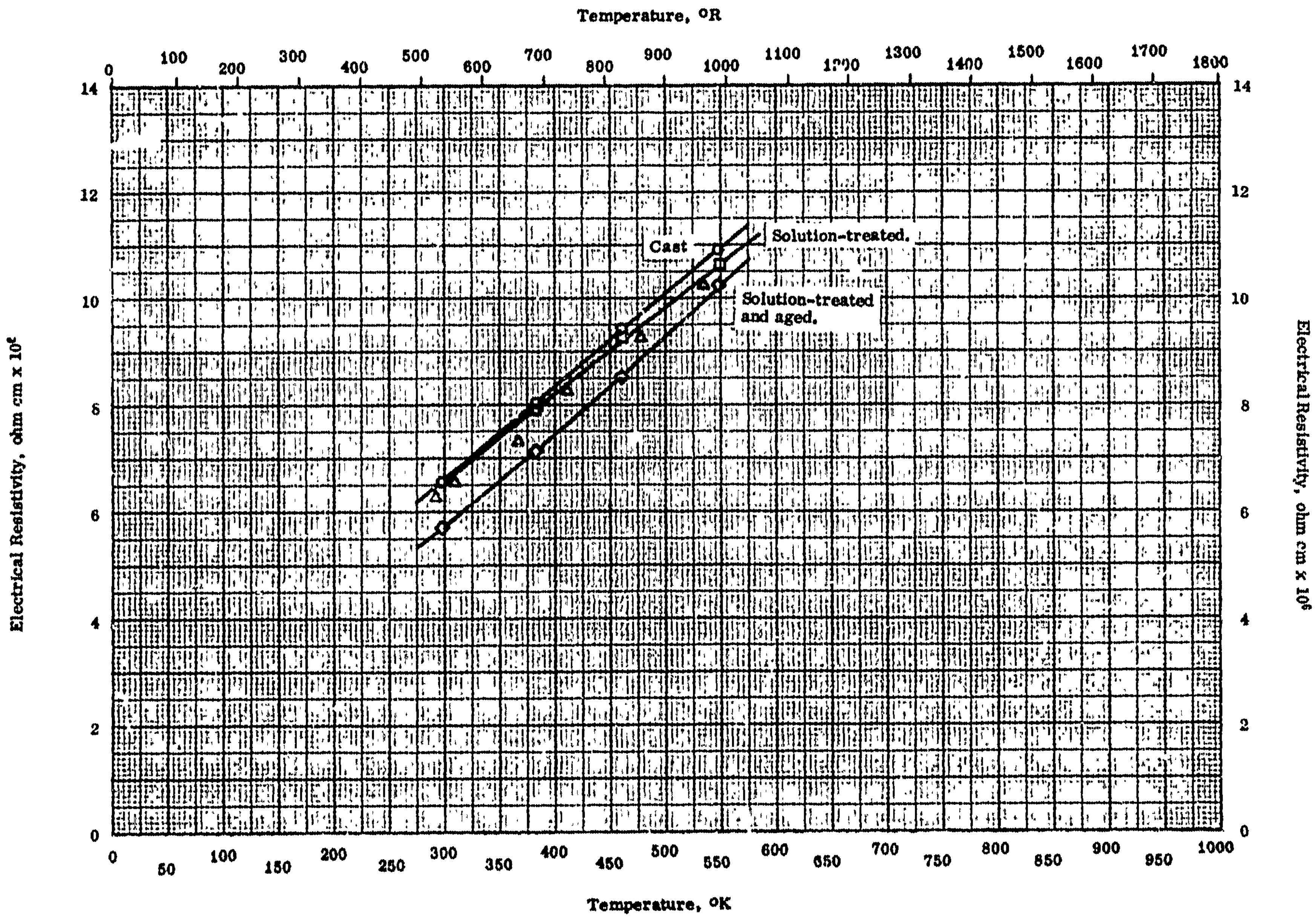


THERMAL LINEAR EXPANSION -- MAGNESIUM + ZINC + ΣX_i
($4 < Zn < 7$; ZK60A)

THERMAL LINEAR EXPANSION -- MAGNESIUM + ZINC + ΣX_i
($4 < Zn < 7$; ZK60A)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-17	298-489		Mg Alloy ZK60A (ingot extruded); 5.78 Zn, 0.74 Zr, 0.048 Mn, 0.03 Al, 0.01> each Ca, Si, Sn, and 0.001> each Cu, Fe, Ni, Pb.	Expansion coefficient for ZK60A given as $(14.72 \pm 0.08) \times 10^{-6}$ F^{-1}.
△	55-17	298-489		Mg Alloy ZK60A (pellet extruded); 5.3 Zn, 0.69 Zr, 0.046 Mn, 0.03> Al, 0.01> each Ca, Si, Sn, 0.006 Pb, and 0.001 each Ca, Fe, Ni.	Longitudinal; author gives expansion coefficient as $(13.83 \pm 0.19) \times 10^{-6}$ F^{-1}.
◇	55-17	298-489		Same as above.	Transverse; author gives expansion coefficient as $(13.84 \pm 0.29) \times 10^{-6}$ F^{-1}.

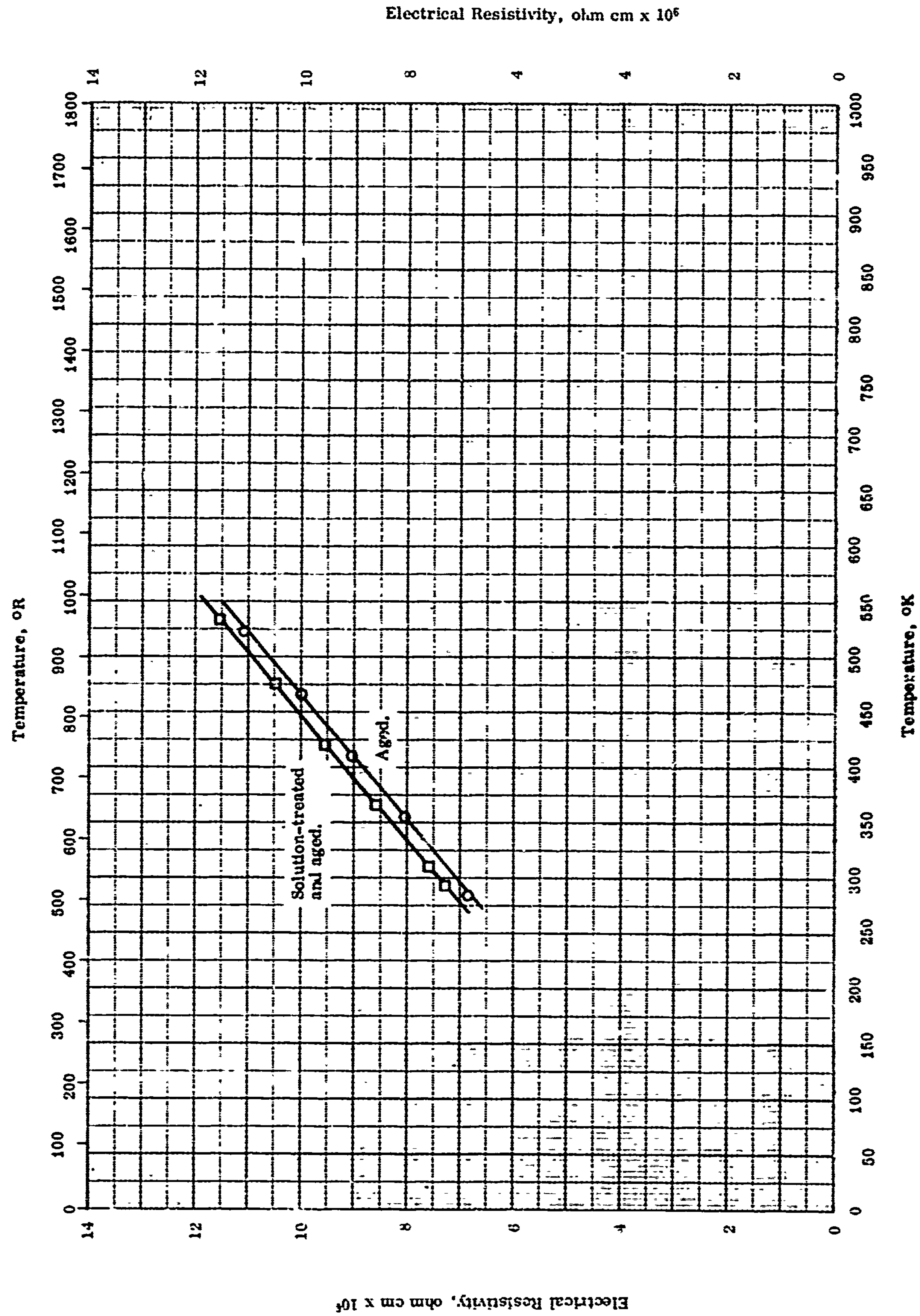


ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EK-30A)

ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EK-30A)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	299-548		3.15 Rare Earths, 0.24 Zr, 0.066 Mn, 0.03 > Al, 0.02 > Zn, 0.01 > each Ca, Si, Sn, 0.002 each Cu, Fe, and 0.001 > each Ni, Pb.	As fabricated; average values for 2 samples plotted; max. dev. from mean 0.42%.
□	56-20	299-549		Same as above.	Solution heat treated; average values for 2 samples plotted; max. dev. from mean 1.25%.
◇	56-20	298-549		Same as above.	Solution heat treated then aged; average values for 2 samples plotted; max. dev. from mean 0.6%.
△	57-18	293-533		3.4 Rare Earths and 0.35 Zr.	Cast; temper T6, solution heat treated and aged.

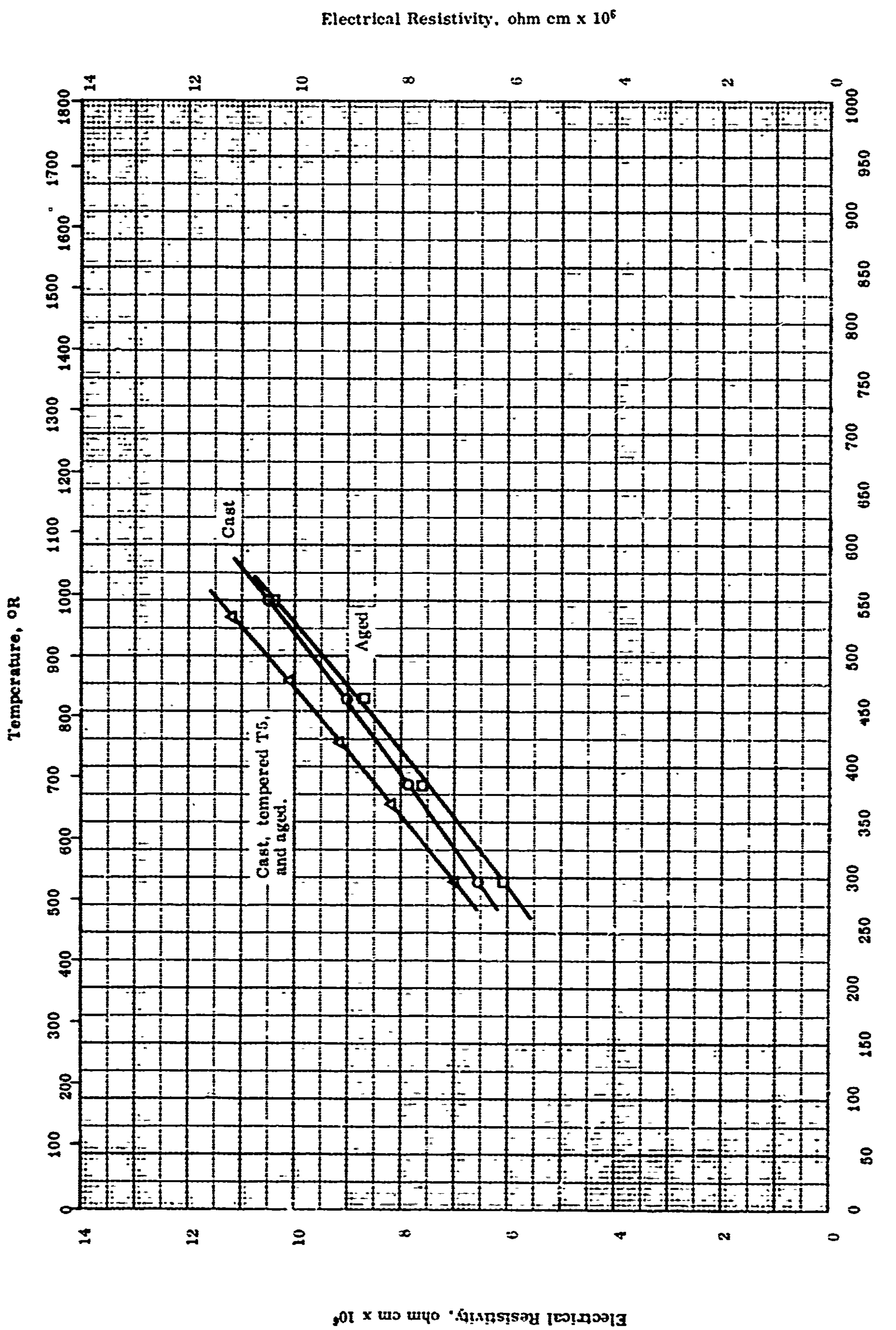


ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EK-41A)

ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EK-41A)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-18	293-533		4.0 total rare earths and 0.55 Zr.	Cast; temper T5 - aged.
□	57-18	293-533		Same as above.	Cast; temper T5, solution heat treated, and aged.

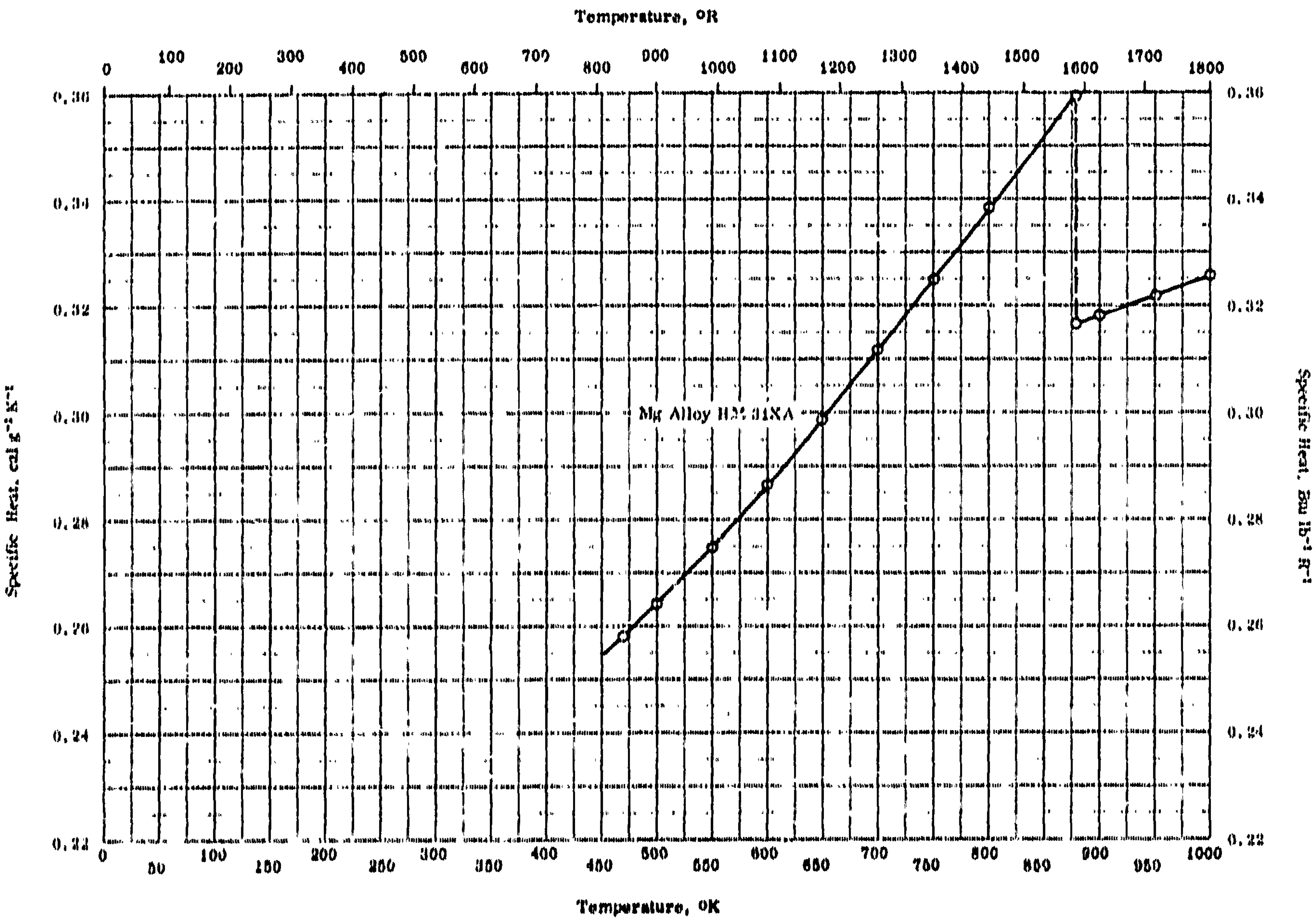


ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EZ-33A)

ELECTRICAL RESISTIVITY -- MAGNESIUM + ΣX_i
(Alloy EZ-33A)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-20	298-550		3.09 rare earth, 2.39 Zn, 0.68 Zr, 0.044 Mn, 0.03 > Al, 0.01 >Ca, 0.01 > Si, 0.01 >Sn, 0.005 Pb, 0.004 Cu, 0.001 > Fe, and 0.001 > Ni.	As fabricated; average values for two samples plotted; max. dev. from mean 1 < 1 %.
□	56-20	298-550		Same as above.	Aged; average values for two samples plotted; max. dev. from mean 1.25%.
△	57-18	293-533		3.0 total rare earths, 2.6 Zn, and 0.65 Zr.	Cast; Temper-T5 and aged.

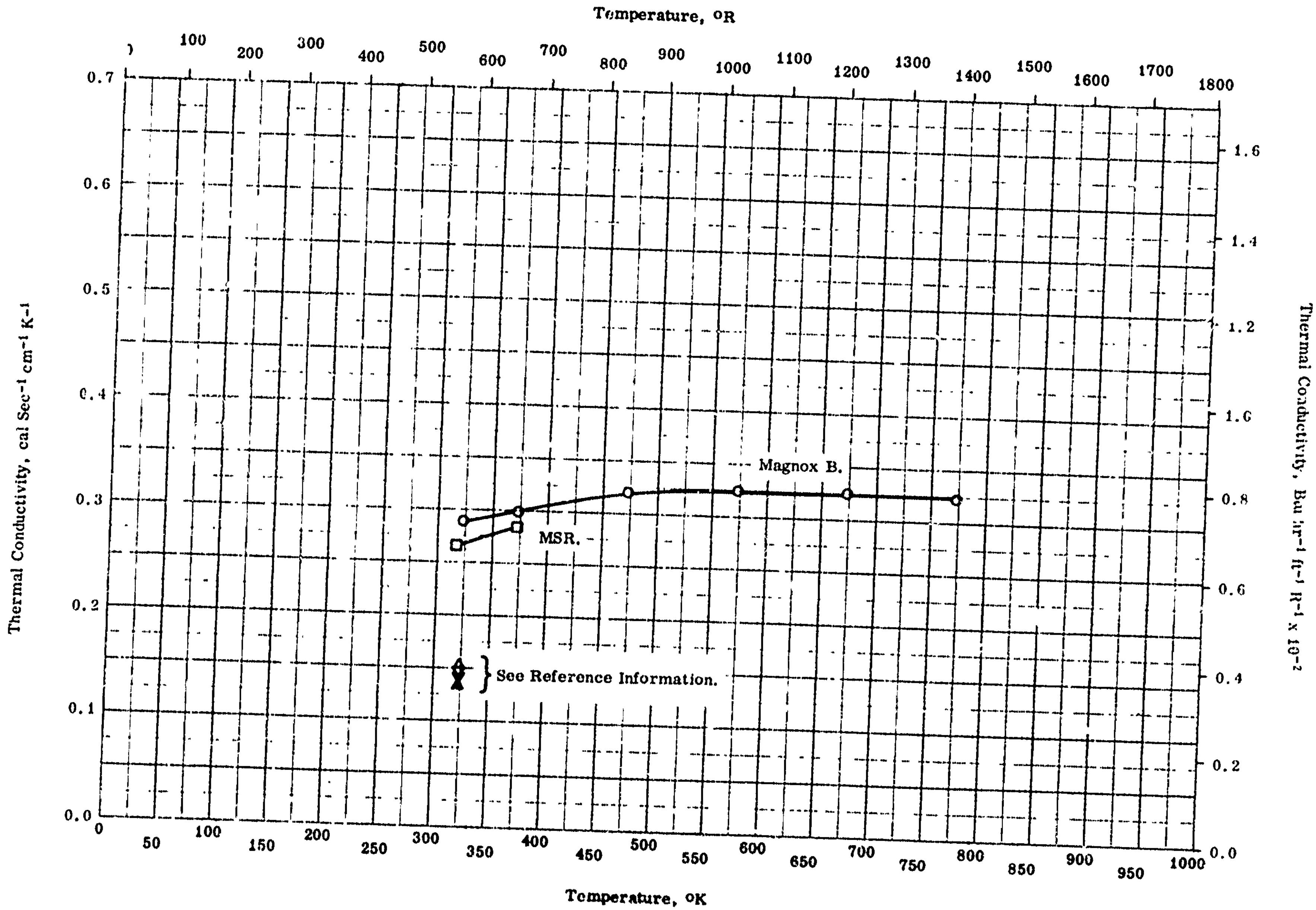


SPECIFIC HEAT — MAGNESIUM + ΣX_i

SPECIFIC HEAT -- MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-18 also 55-17	470-1009		Mg alloy HM 31XA; 2.98 total rare earth, 1.40 Mn, 0.05 Zn, and 0.03 Al.	

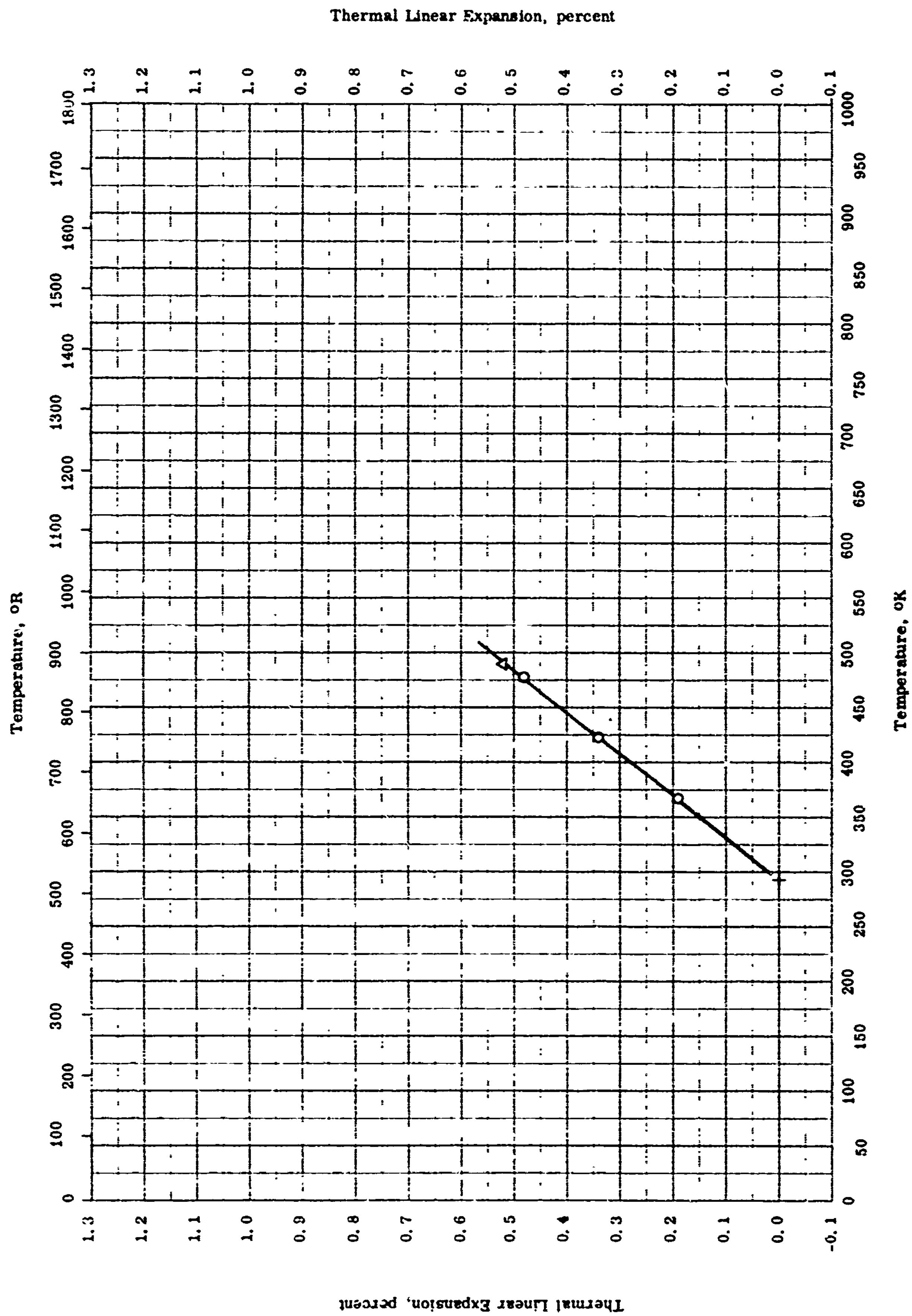


'ERMAL CONDUCTIVITY -- MAGNESIUM + ΣX_i

THERMAL CONDUCTIVITY -- MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	64-3	323-773		Magnox B; 1.0 Al and 0.002-0.003 Be.	
□	64-3	318-373		MSR; 2.63 Ag, 1.79 Re, and 0.4 Zn.	Sand-cast; heated 8 hrs at 525 C, hot water quenched, and then 8 hrs at 200 C.
△	64-3	323		D. T. D. 356; 6 Sn, 3.5 Al, 0.5 >sum of Cu, Ni, Fe, and Si.	Sand-cast.
▲	64-3	323		D. T. D. 360; same as above.	Solution heat-treated from the above sample.
▽	64-3	323		D. T. D. 350; same as above.	Die-cast.
▼	64-3	323		D. T. D. 360; same as above.	Solution heat-treated from the above sample.

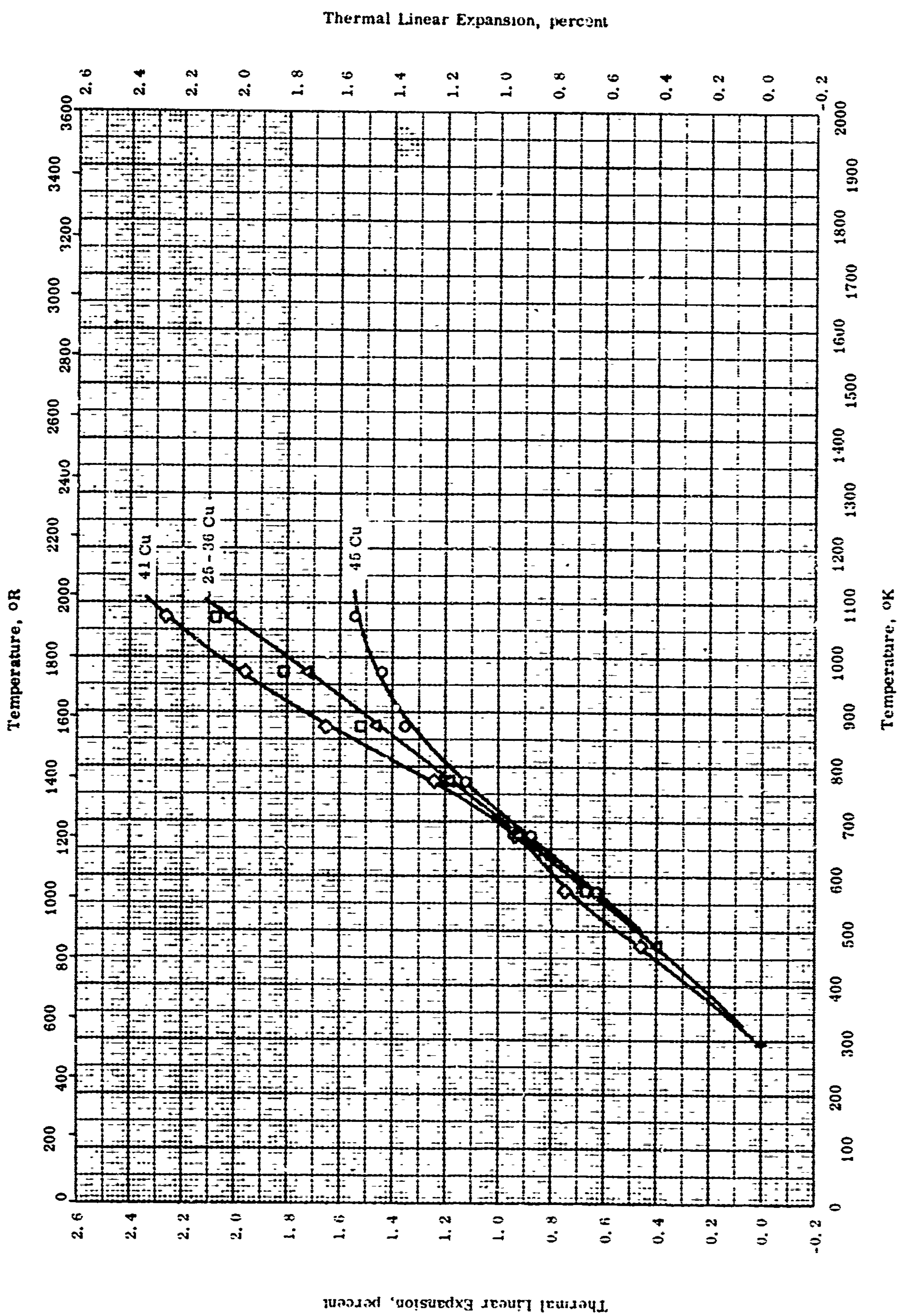


THERMAL LINEAR EXPANSION -- MAGNESIUM + ΣX_i
(2< rare earth metals < 5)

THERMAL LINEAR EXPANSION -- MAGNESIUM + ΣX_i
(2< rare earth metals < 5)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-19	293-478		Mg Alloys EK30, EK32A, EK33A, and EK41; no analyses given; nominal: 2-5 rare earths, 3.5> Zn, and 1> others.	Cast and aged; results for the four materials are within ±0.8% of the average values plotted.
△	55-17	298-488		Mg Alloy EZ33A; 3.09 rare earths, 2.39 Zn, 0.68 Zr, 0.044 each Mn, Cu, 0.03> Al, 0.01> each Ca, Si, Sn, 0.005 P, 0.001> each Fe, Ni.	Cast and aged.

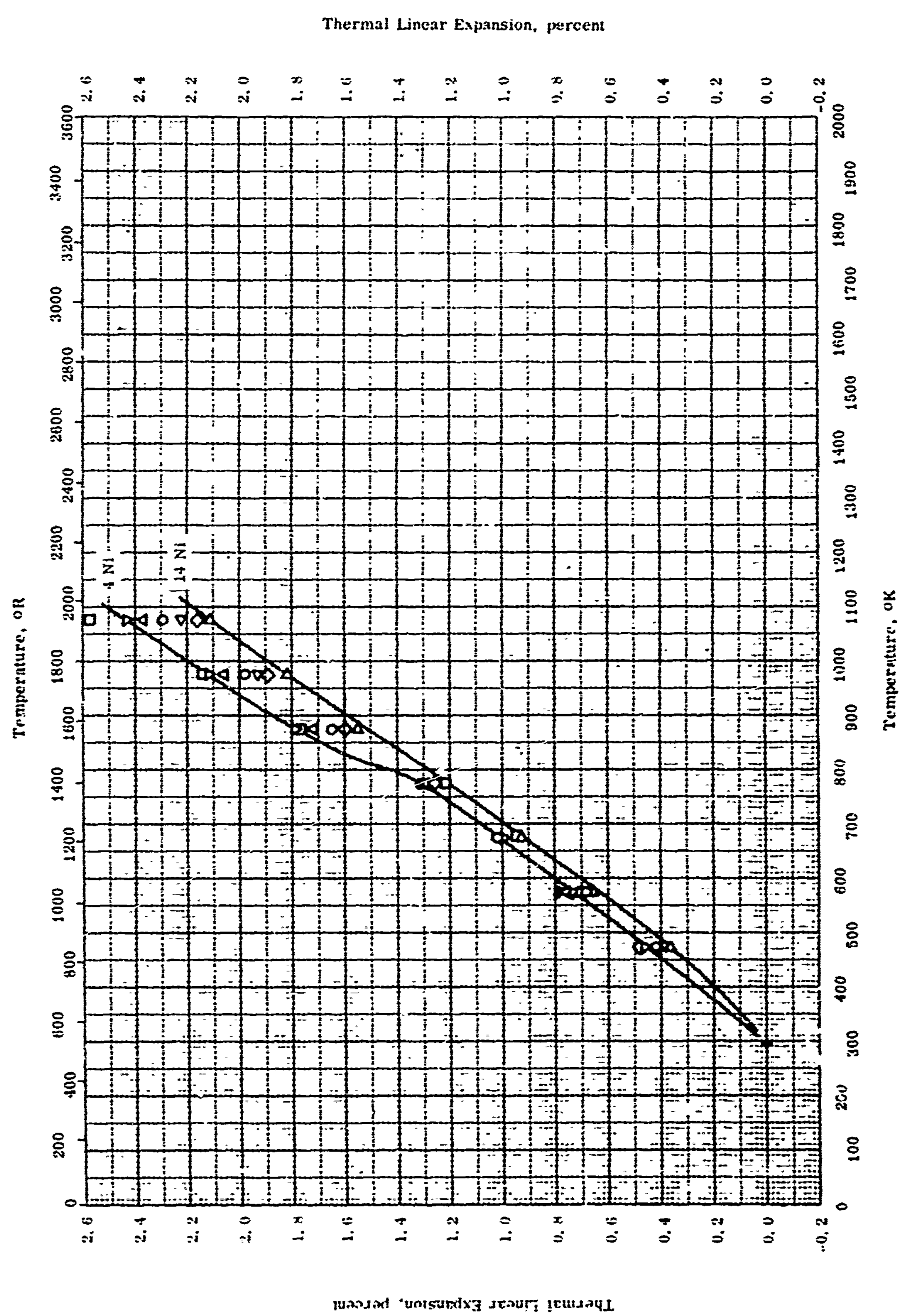


THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
($49 < Mn < 56$)

THERMAL LINEAR EXPANSION -- MANGANESE COPPER + ΣX_i
($49 < Mn < 56$)

REFERENCE INFORMATION

Symbol	Ref	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	473-1073		49.7 Mn, 45.4 Cu, and 4.9 Ni; prepared from electrolytic purity materials.	Quenched and homogenized.
◇	55-38	473-1073		53.4 Mn, 41.0 Cu, and 5.6 Ni; same as above.	Same as above.
□	55-38	473-1073		51.5 Mn, 38.6 Cu, and 9.9 Ni; same as above.	Same as above.
△	55-38	473-1073		Six samples: a) 51.6 Mn, 35.8 Cu, and 12.6 Ni; b) 55.0 Mn, 35.4 Cu, and 9.6 Ni; c) 54.3 Mn, 31.3 Cu, and 14.4 Ni; d) 51.3 Mn, 29.5 Cu, and 19.2 Ni; e) 51.0 Mn, 25.4 Cu, and 23.6 Ni; f) 55.2 Mn, 25.0 Cu, and 19.8 Ni.	Same as above; these six samples gave results which agree within 2%.

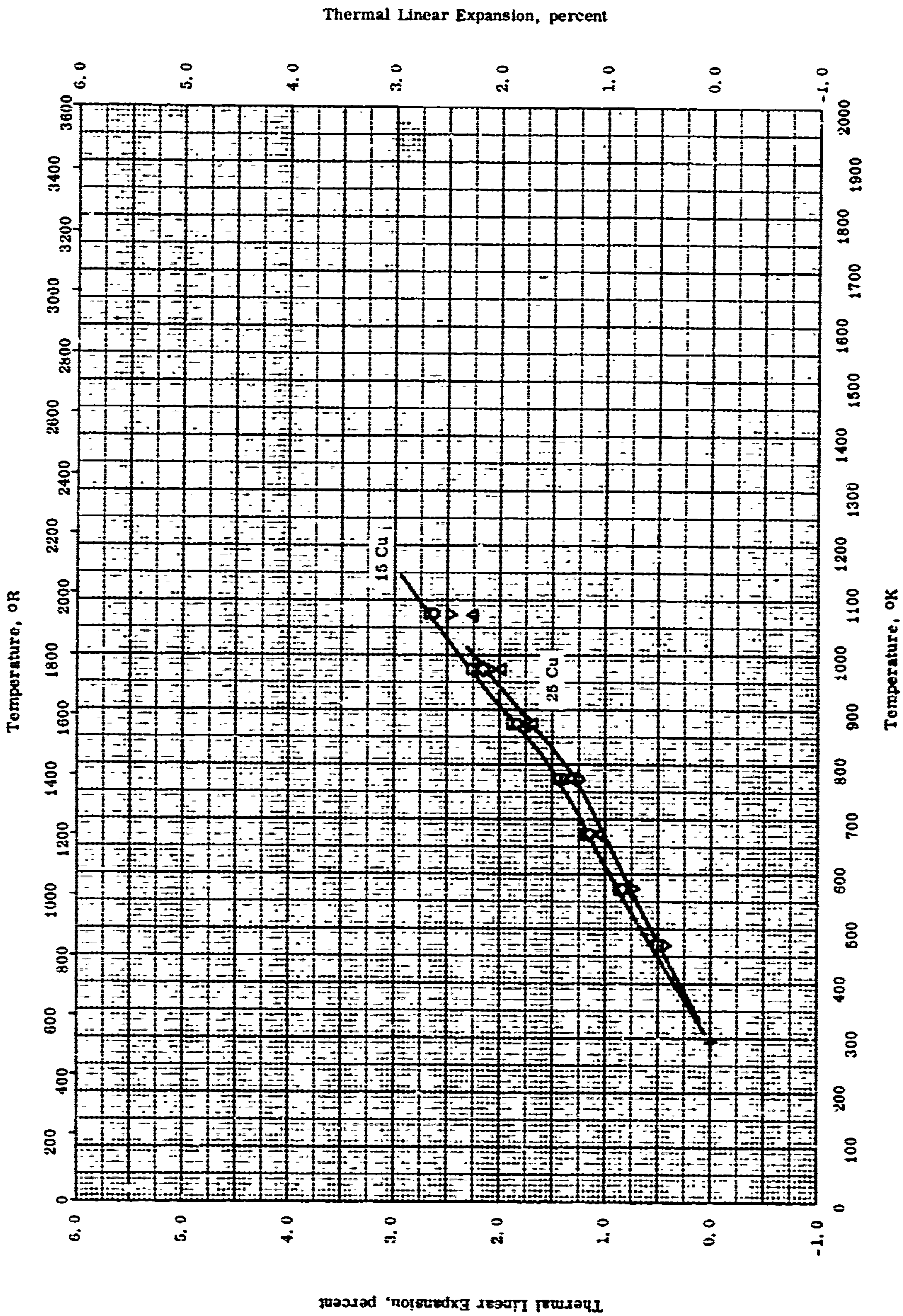


THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
($59 < Mn < 66$)

THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
(59 < Mn < 66)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-38	293-1073		65.9 Mn, 19.5 Cu, and 14.6 Ni; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	56-38	293-1073		65.4 Mn, 29.7 Cu, and 4.9 Ni; same as above.	Same as above.
△	56-38	293-1073		65.4 Mn, 24.4 Cu, and 10.2 Ni; same as above.	Same as above.
◇	56-38	293-1073		59.8 Mn, 21.8 Cu, and 18.4 Ni; same as above.	Same as above.
▽	56-38	293-1073		59.7 Mn, 36.5 Cu, and 3.8 Ni; same as above.	Same as above.
◁	56-38	293-1073		59.7 Mn, 33.5 Cu, and 6.8 Ni; same as above.	Same as above.
▷	56-38	293-1073		59.7 Mn, 25.9 Cu, and 14.4 Ni; same as above.	Same as above.

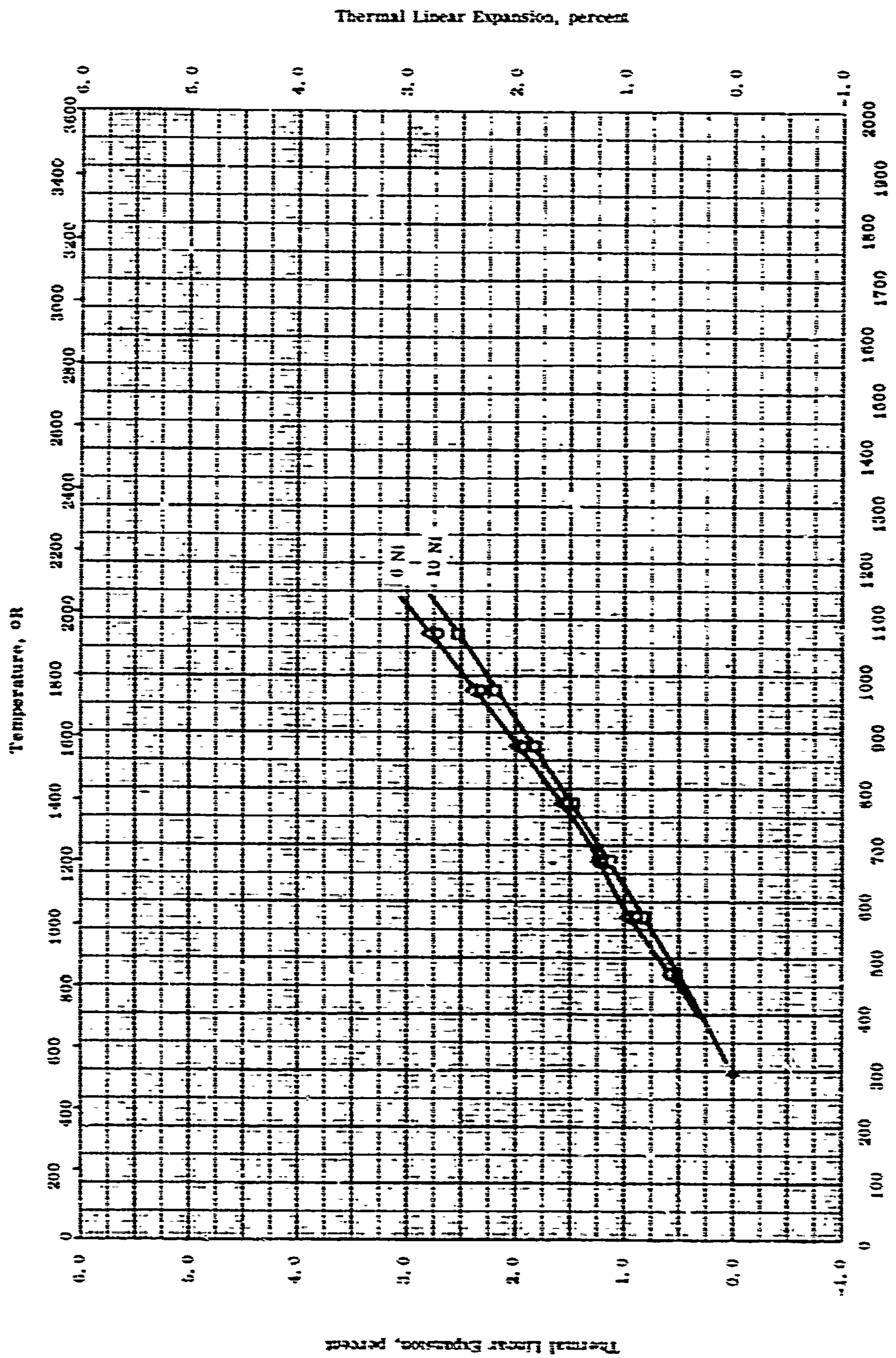


THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
($69 < Mn < 76$)

THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
(69< Mn <76)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	293-1073		75.5 Mn, 18.6 Cu, and 5.6 Ni; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	293-1073		75.3 Mn, 14.6 Cu, and 10.1 Ni; same as above.	Same as above.
△	55-38	293-1073		70.9 Mn, 15.3 Cu, and 13.8 Ni; same as above.	Same as above.
◇	55-38	293-1073		70.7 Mn, 24.6 Cu, and 9.7 Ni; same as above.	Same as above.
▽	55-38	293-1073		69.6 Mn, 20.1 Cu, and 10.3 Ni; same as above.	Same as above.

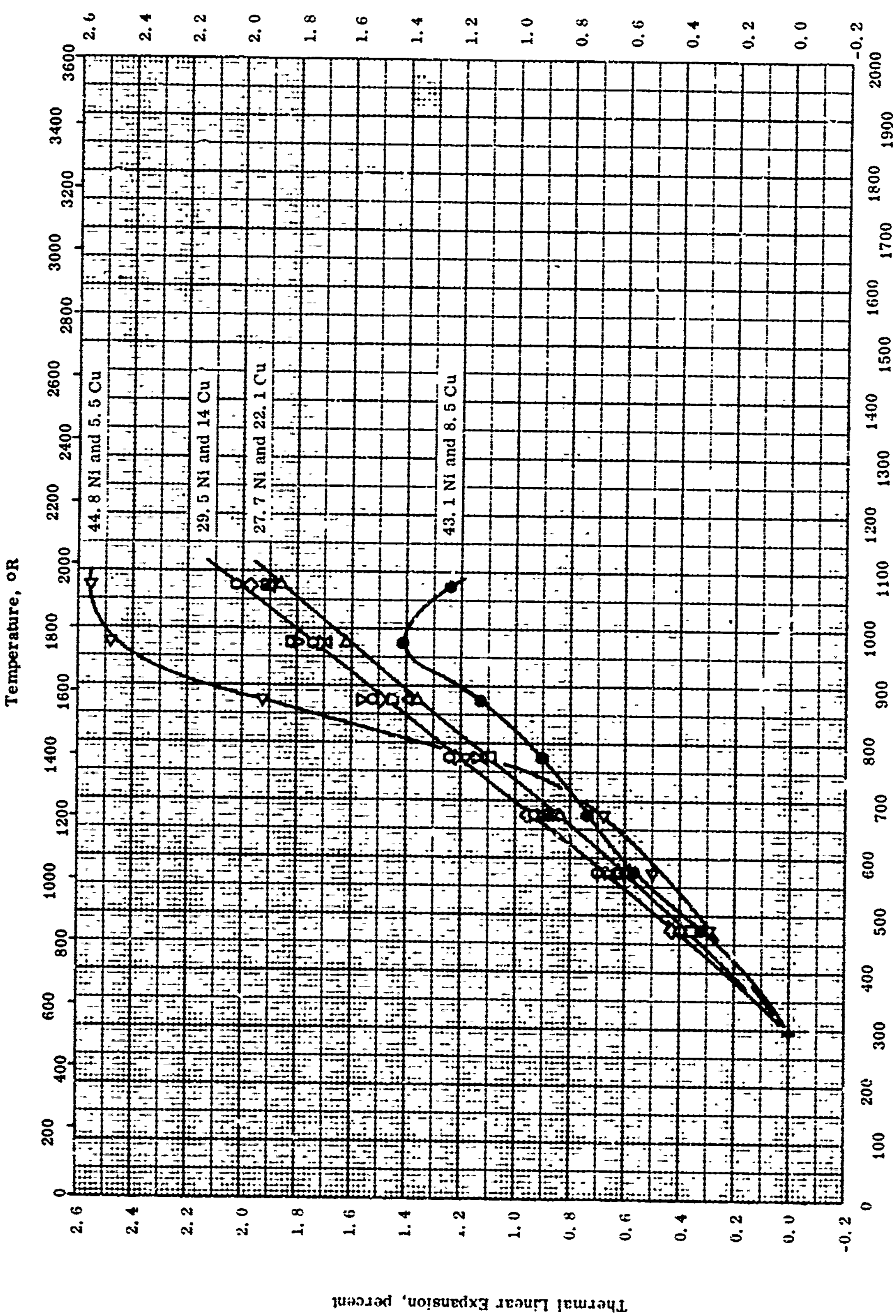


THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
($70 \le Mn \le 84$)

THERMAL LINEAR EXPANSION -- MANGANESE + COPPER + ΣX_i
(79 < Mn < 84)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	473-1073		79.2 Mn, 15.0 Cu, and 5.8 Ni; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	473-1073		79.8 Mn, 10.2 Cu, and 10.0 Ni; same as above.	Same as above.
△	55-38	473-1073		83.4 Mn, 10.7 Cu, and 5.9 Ni; same as above.	Same as above.

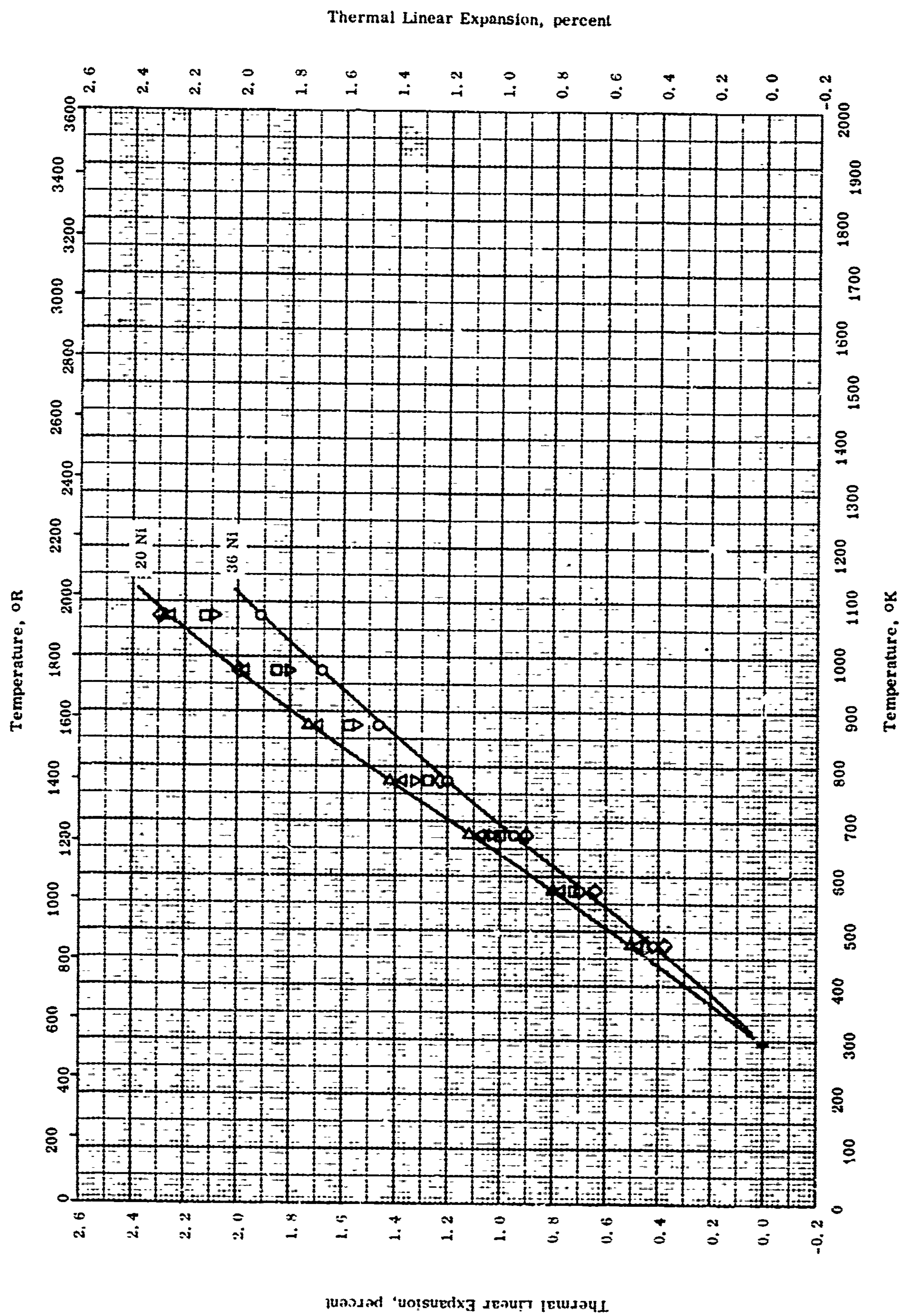


THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
($48 < Mn < 57$)

THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
(48 < Mn < 57)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	293-1073		56.5 Mn, 29.5 Ni, and 14 Cu; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	293-1073		55.0 Mn, 39.5 Ni, and 5.5 Cu; same as above.	Same as above.
△	55-38	293-1073		54.5 Mn, 35.0 Ni, and 10.5 Cu; same as above.	Same as above.
◇	55-38	293-1073		54.2 Mn, 27.7 Ni, and 21.1 Cu; same as above.	Same as above.
▽	55-38	293-1073		51.9 Mn, 35.7 Ni, and 12.4 Cu; same as above.	Same as above.
▷	55-38	293-1073		51.1 Mn, 27.7 Ni, and 22.1 Cu; same as above.	Same as above.
◁	55-38	293-1073		49.7 Mn, 44.8 Ni, and 5.5 Cu; same as above.	Same as above.
●	55-38	293-1073		48.4 Mn, 43.1 Ni, and 8.5 Cu; same as above.	Same as above.

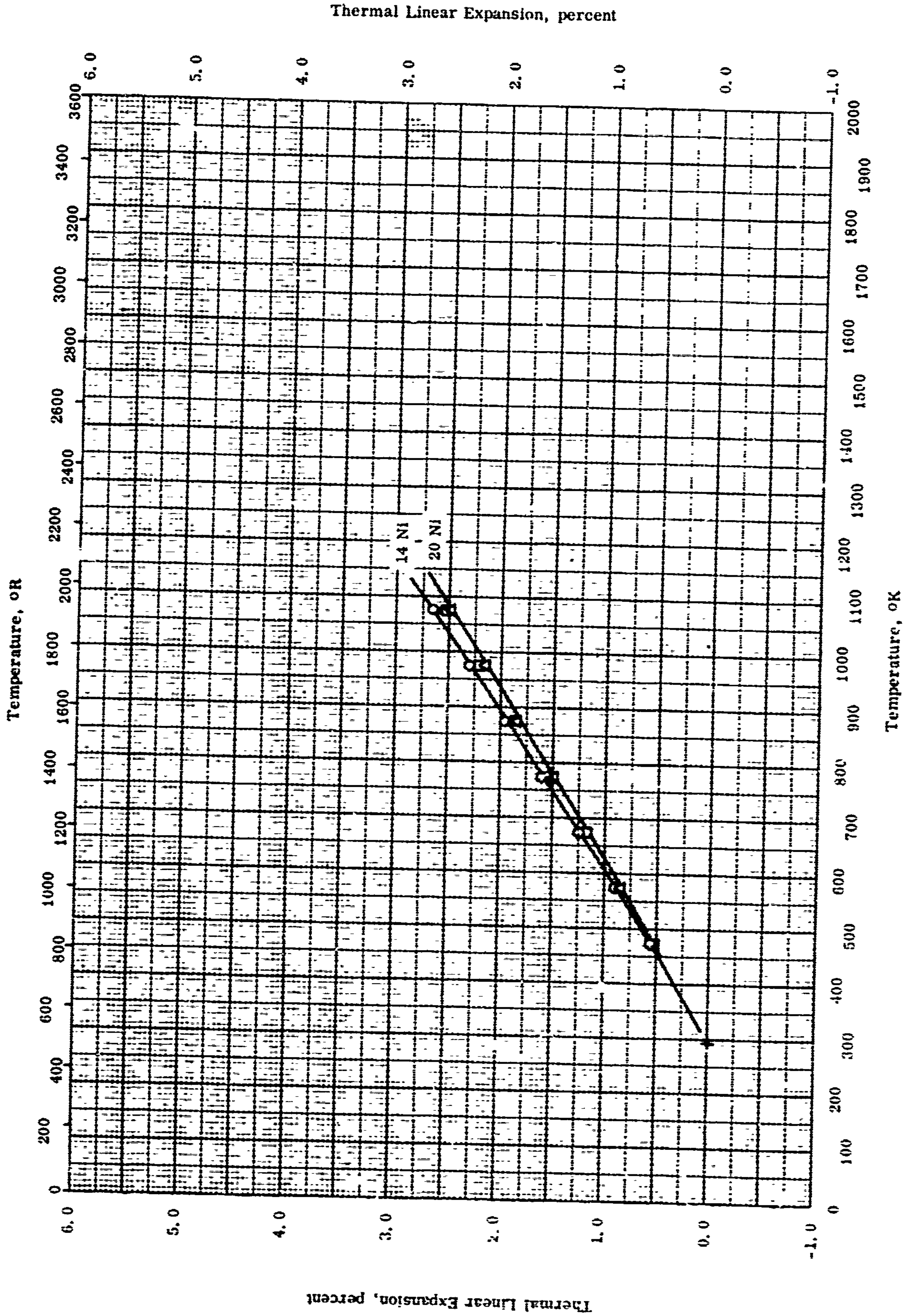


THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
($59 < Mn < 70$)

THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
($59 < Mn < 70$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	473-1073		59.6 Mn, 36.2 Ni, and 4.2 Cu; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	473-1073		59.3 Mn, 30.3 Ni, and 10.4 Cu; also 60.0 Mn, 24.4 Ni, and 15.6 Cu; same as above.	Same as above; results agree within 2%.
△	55-38	473-1073		64.4 Mn, 24.7 Ni, and 10.9 Cu; same as above.	Same as above; quenched and homogenized.
◇	55-38	473-1073		64.6 Mn, 20.4 Ni, and 15 Cu; same as above.	Same as above.
▽	55-38	473-1073		64.8 Mn, 30.0 Ni, and 5.2 Cu; same as above.	Same as above.
▷	55-38	473-1073		69.5 Mn, 20.5 Ni, and 10 Cu; also 69.6 Mn, 24.6 Ni, and 5.8 Cu; same as above.	Same as above; results agree within 2%.

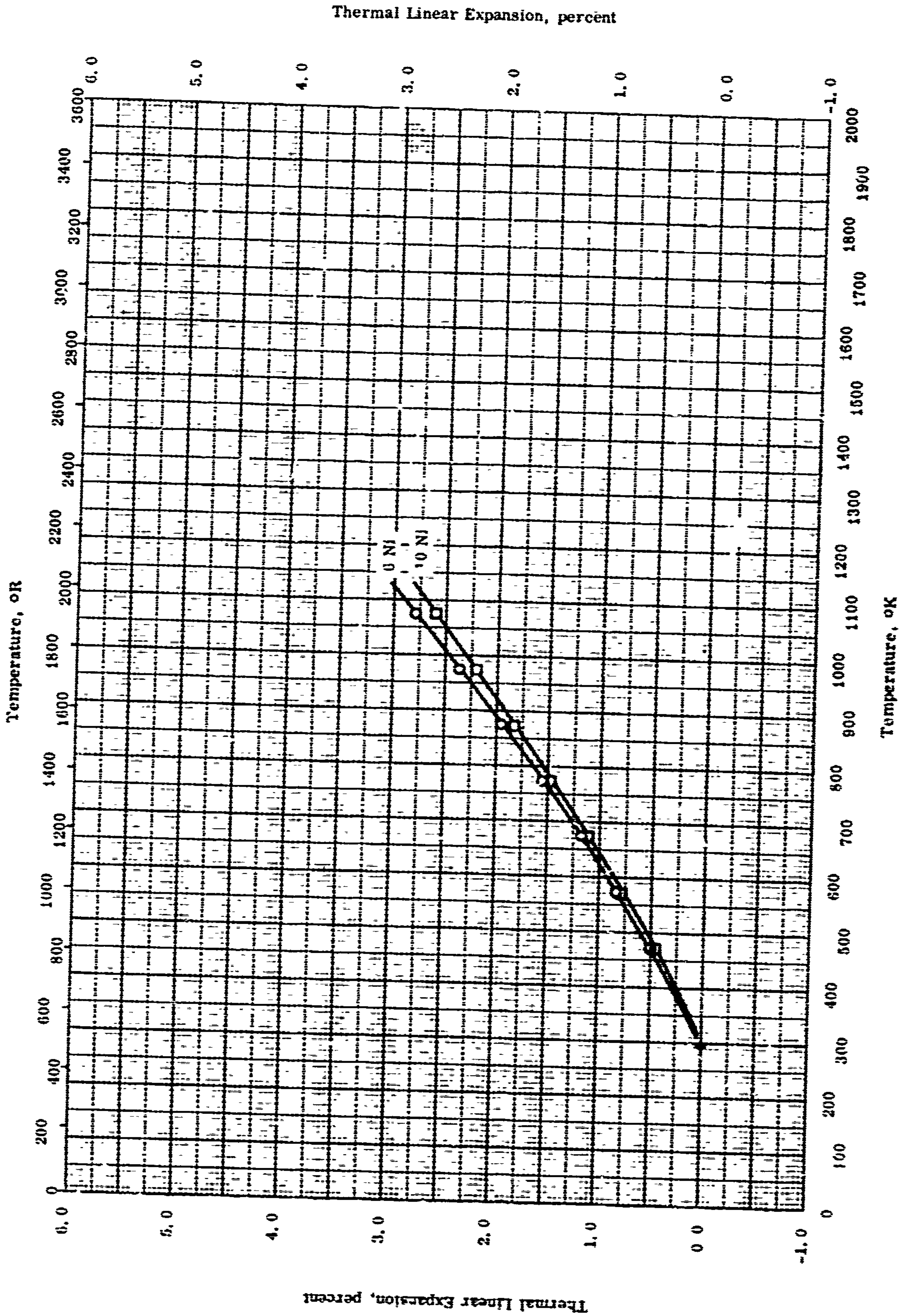


THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
($75 < Mn < 80$)

THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
($75 < Mn < 80$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	293-1073		79.5 Mn, 14.3 Ni, and 6.2 Cu; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	293-1073		75.2 Mn, 15.3 Ni, and 9.5 Cu; same as above.	Same as above.
△	55-38	293-1073		75.1 Mn, 20.1 Ni, and 4.8 Cu; same as above.	Same as above.



THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
(84 < Mn < 89)

THERMAL LINEAR EXPANSION -- MANGANESE + NICKEL + ΣX_i
(84< Mn <89)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-38	293-1073		88.1 Mn, 6.0 Ni, and 5.9 Cu; prepared from electrolytic purity raw materials.	Quenched and homogenized.
□	55-38	293-1073		84.6 Mn, 10.2 Ni, and 5.2 Cu; same as above.	Same as above.

PROPERTIES OF MOLYBDENUM + NICKEL + ΣX_i

REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
O 31 Ni and 15 Cu	9.06	566

PROPERTIES OF MOLYBDENUM + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	55-32	298		54 Mo, 31 Ni, and 15 Cu.	

PROPERTIES OF MOLYBDENUM + NIOBIUM + ΣX_i

REPORTED VALUES

Density:		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	10 Nb and 10 Ti	8.45	528
□	30 Nb and 10 Ti	7.62	476
△	20 Nb and 20 Ti	7.0	437
▽	40 Nb and 10 Ti	7.35	459
◁	30 Nb and 20 Ti	7.1	443
▷	40 Nb and 20 Ti	6.80	425
◇	30 Nb and 30 Ti	6.63	414

PROPERTIES OF MOLYBDENUM + NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-22	298		80 Mo, 10 Nb, and 10 Ti; prepared from 99.9 pure Mo, 98.9 pure Nb, and 99.5 pure Ti.	Pressed at 4 ton cm^{-2} from powders, vacuum sintered 5 hrs each at 400C, 600C, 800C, and 25 hrs at 1000 C and 12 hrs at 1700-1800 C; density from X-ray lattice dimensions; value 5-7% lower than theoretical value.
□	58-22	298		60 Mo, 30 Nb, and 10 Ti; same as above.	Same as above.
△	58-22	298		60 Mo, 20 Nb, and 20 Ti; same as above.	Same as above.
▽	58-22	298		50 Mo, 40 Nb, and 10 Ti; same as above.	Same as above.
◁	58-22	298		50 Mo 30 Nb, and 20 Ti; same as above.	Same as above.
▷	58-22	298		40 Mo, 40 Nb, and 20 Ti; same as above.	Same as above.
◇	58-22	298		40 Mo, 30 Nb, and 30 Ti, same as above.	Same as above.

PROPERTIES OF MOLYBDENUM + TITANIUM + ΣX_i

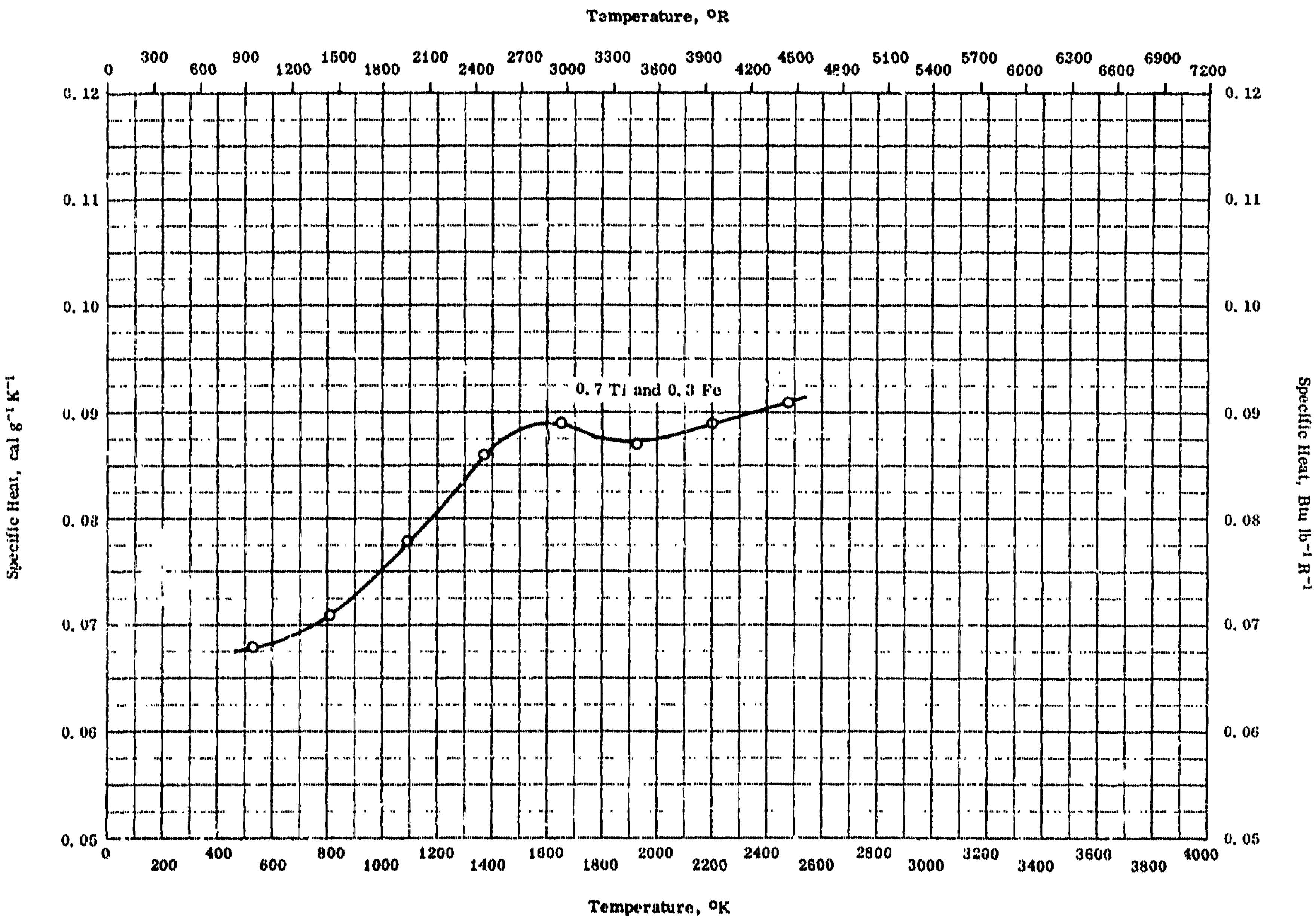
REPORTED VALUES

Density:		g cm^{-3}	lb ft^{-3}
○	10 Ti and 10 Nb	8.45	528
□	20 Ti and 10 Nb	7.55	471
△	30 Ti and 10 Nb	6.68	417
▽	20 Ti and 20 Nb	7.00	437
●	40 Ti and 10 Nb	6.32	395
■	30 Ti and 20 Nb	6.8	425
▲	40 Ti and 20 Nb	6.15	384
▼	30 Ti and 30 Nb	6.63	414

PROPERTIES OF MOLYBDENUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-22	298		80 Mo, 10 Ti, and 10 Nb; prepared from 99.9 Mo, 99.5 Ti, and 98.9 Nb.	Pressed at 4 ton cm^{-2} from powder; vacuum sintered 5 hrs each at 400 C, 600 C, 800 C, 25 hrs at 1000 C, and 12 hrs at 1800 C; density from X-ray lattice dimension; value 5-7 % lower than theoretical values.
□	58-22	298		70 Mo, 20 Ti, and 10 Nb; same as above.	Same as above.
△	58-22	298		60 Mo, 30 Ti, and 10 Nb; same as above.	Same as above.
▽	58-22	298		60 Mo, 20 Ti, and 20 Nb; same as above.	Same as above.
●	58-22	298		50 Mo, 40 Ti, and 10 Nb; same as above.	Same as above.
■	58-22	298		50 Mo, 30 Ti, and 20 Nb; same as above.	Same as above.
▲	58-22	298		40 Mo, 40 Ti, and 20 Nb; same as above.	Same as above.
▼	58-22	298		40 Mo, 30 Ti, and 30 Nb; same as above.	Same as above.

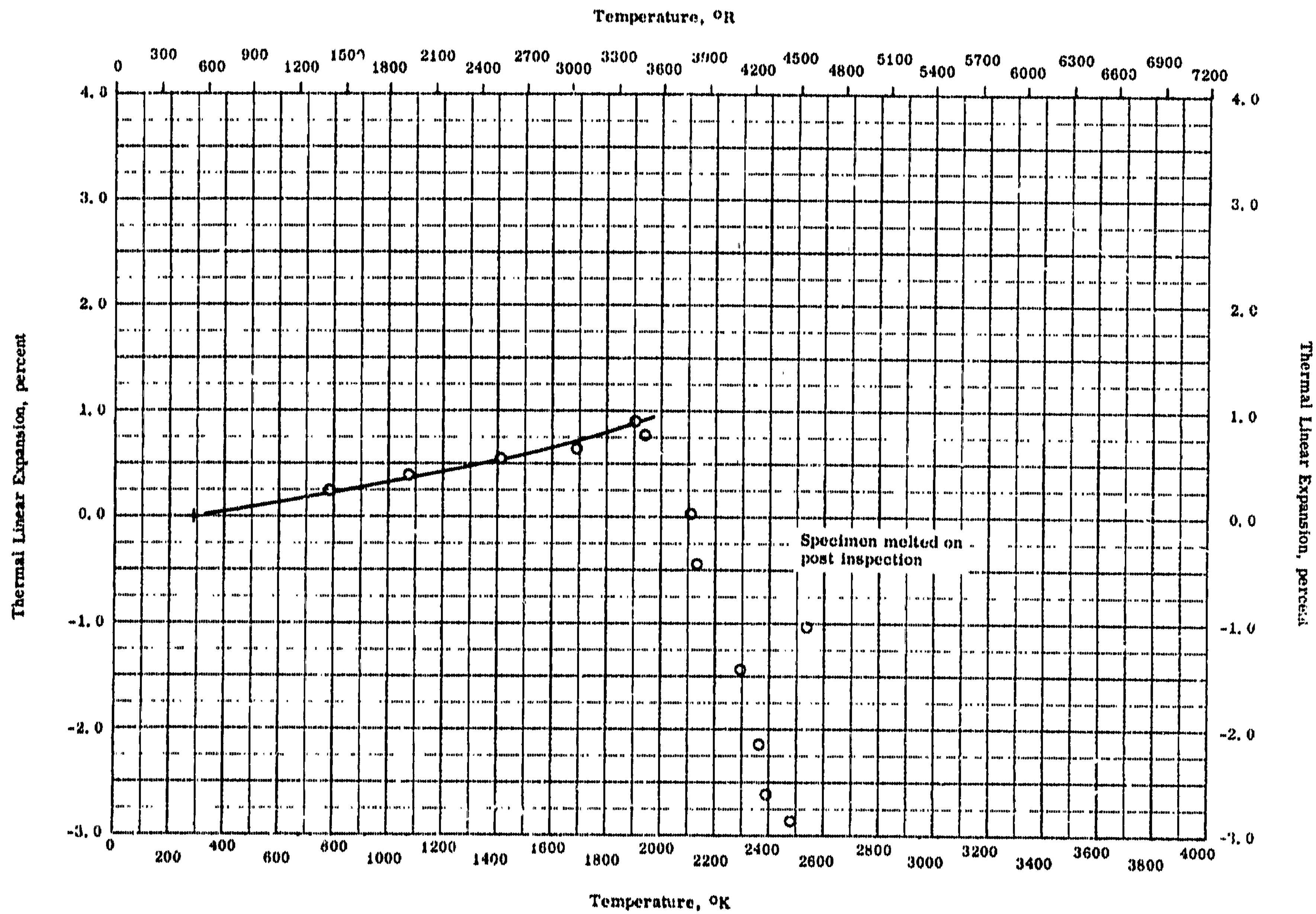


SPECIFIC HEAT -- MOLYBDENUM + TITANIUM + ΣX_i

SPECIFIC HEAT -- MOLYBDENUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-4	533-2478	±5.0	Before test: 98.6 Mo, 0.7 Ti, 0.3 Fe, 0.2 Al, 0.2 Ni, 0.1 Si; density 585 lb ft^{-3}; after exposure: 98.3 Mo, 0.2 C; density 566 lb ft^{-3}.	Crushed in hardened steel mortor to pass 100-mesh screen; hot pressed.



THERMAL LINEAR EXPANSION -- MOLYBDENUM + TITANIUM + ΣX_i

THERMAL LINEAR EXPANSION — MOLYBDENUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	62-4	294-2539	5	General Astrometals Corp.; composition before exposure: 98.6 Mo, 0.7 Ti, and elements found by semi-quantitative emission spectrography (0.3 Fe, 0.2 Al, 0.2 Ni, and 0.1 Si); after exposure: 98.3 Mo; density before exposure 9.49 g cm^{-3} and after exposure 8.64 g cm^{-3}. [Author's design.: Run 10].	Hot pressed; measured in helium; specimen melted on post inspection.

PROPERTIES OF MOLYBDENUM + ΣX_i

REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
△ 99 Mo	6.96	434
◇ 99 Mo	8.8	549
▽ 99 Mo	10.2	637

PROPERTIES OF MOLYBDENUM $+\Sigma X_i$

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	50-13	298		99 Mo.	Pressed fr m -270 mesh powder at 8150c psi.
◇	50-13	298		99 Mo.	Pressed from -270 mesh powder at 81500 psi and fired 2 min at 2200 C.
▽	50-13	298		99 Mo.	Density data probably from X-ray measurement.

PROPERTIES OF NEPTUNIUM + CALCIUM + ΣX_i

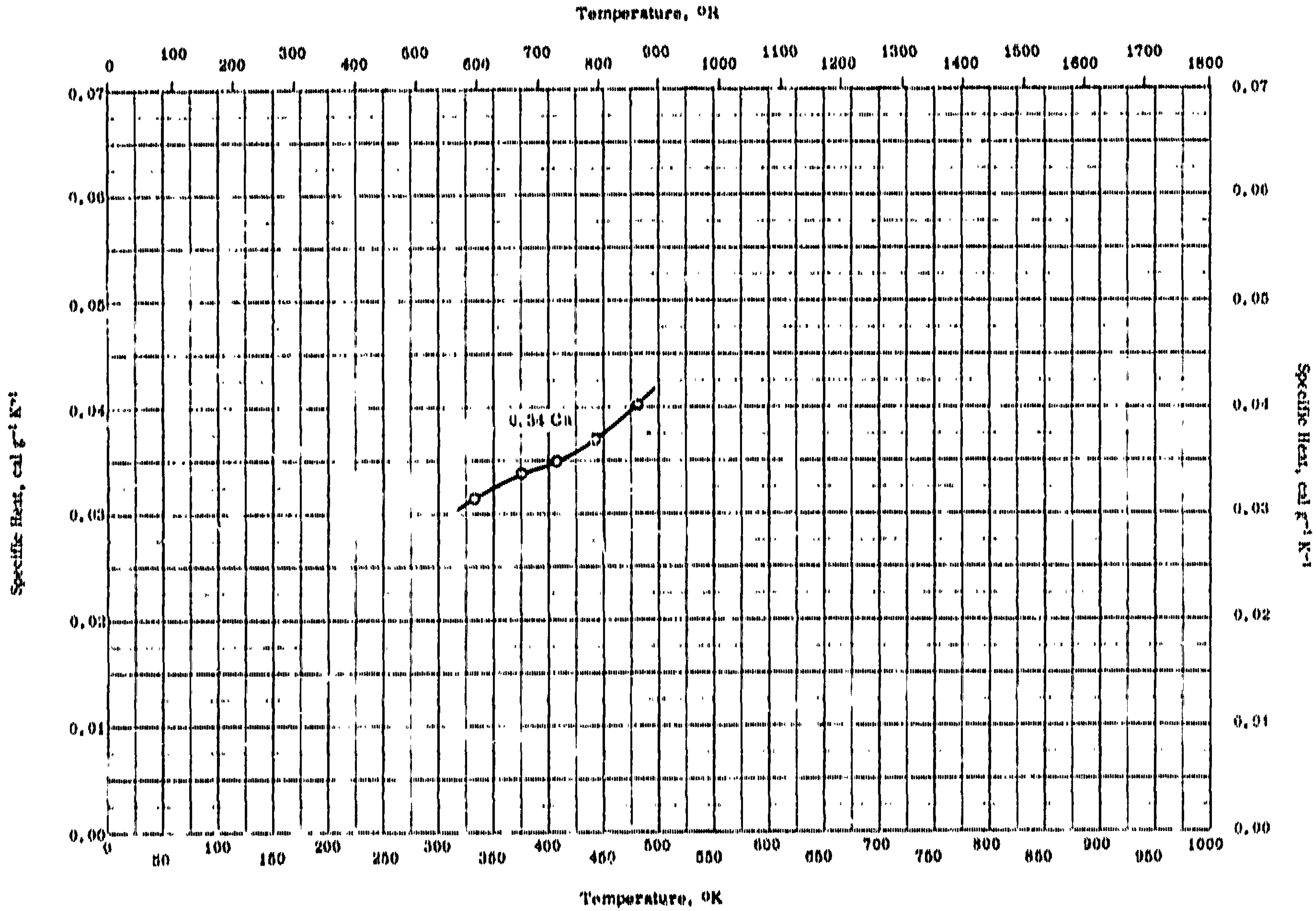
REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
○ 0.34 Ca and 0.22 U	20.2	1260
◇ 0.34 Ca and 0.22 U	20.2	1260
▽ 0.34 Ca and 0.22 U	20.45	1277

PROPERTIES OF NEPTUNIUM + CALCIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-41	293		0.34 Ca, 0.22 U, 0.06 each Ni and V, 0.05 Mo, 0.03 each Mg, Cr, and Pu, and 0.02 Al.	
◇	57-43	293		Same as above except with addition traces of F and O_2	
▽	57-43	293		Same as above.	Density by x-ray measurement.



SPECIFIC HEAT -- NEPTUNIUM + CALCIUM + ΣX_i

SPECIFIC HEAT -- NEPTONIUM + CALCIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	58-19	333-480	≤2.0	99.4 Np, 0.34 Ca, and 0.22 U.	

PROPERTIES OF NEODYMIUM + MAGNESIUM + ΣX_i

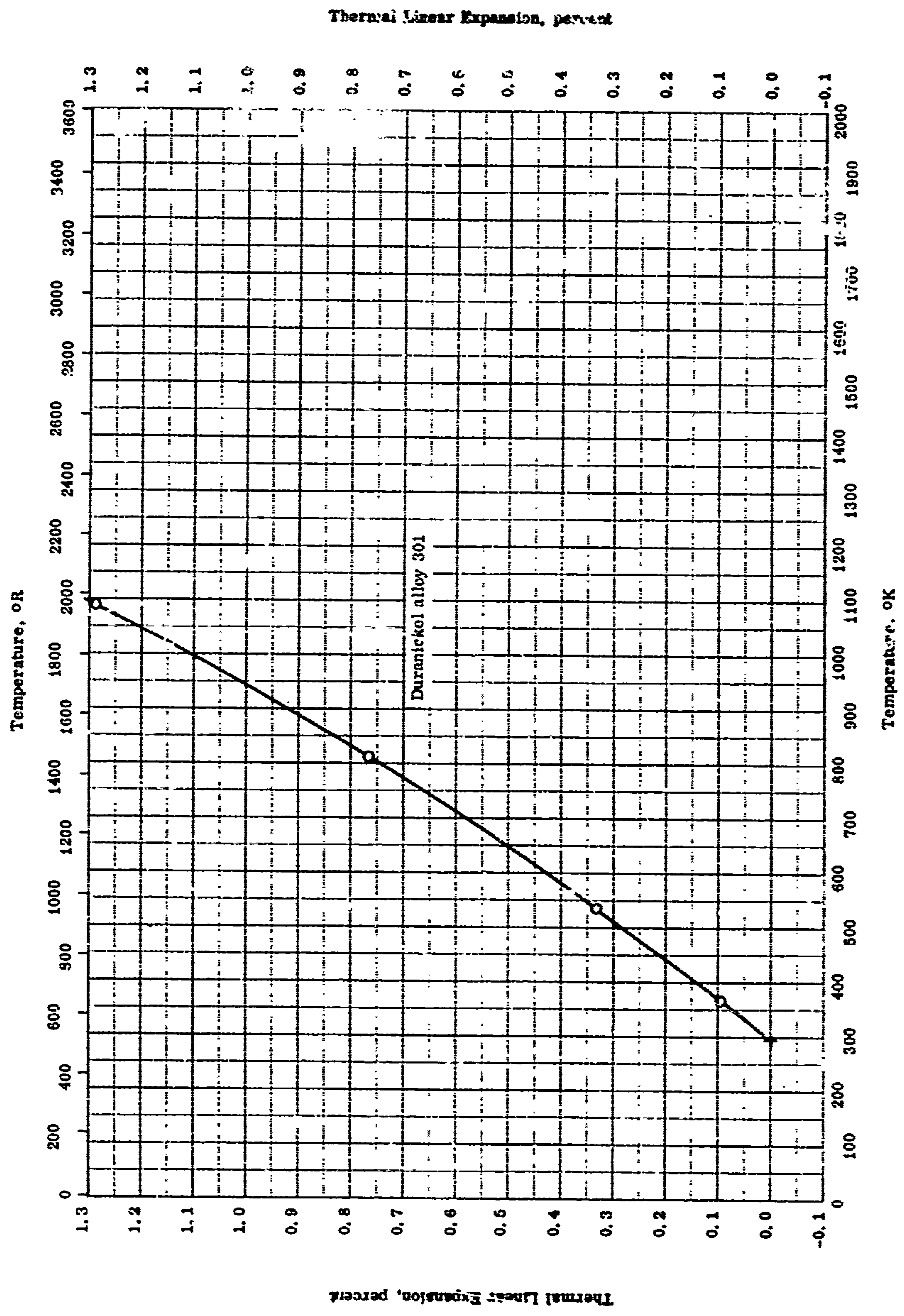
REPORTED VALUES

	$g\ cm^{-3}$	$lb\ ft^{-3}$
Density:		
○ 1.0 Mg and 0.5 Ca	6.999	436.9
Melting Point:		
□ 1.0 Mg and 0.5 Ca	1023 ± 10	1968 ± 18

PROPERTIES OF NEODYMIUM + MAGNESIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-20	298		1.0 Mg and 0.5 Ca.	
□	53-20	1083-1103		Same as above.	



THERMAL LINEAR EXPANSION -- NICKEL + ALUMINUM + ΣXi

THERMAL LINEAR EXPANSION -- NICKEL + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	65-4	294-1089		Duranickel alloy 301; formerly Duranickel alloy from International Nickel Co.; nominal: 94.0 Ni, 4.50 Al, 0.55 Si, 0.50 Ti, 0.25 Mn, 0.15 C, 0.15 Fe, 0.05 Cu and 0.005 S; density 0.298 lb in.$^{-3}$ and melting point 2550 - 2620 F.	

PROPERTIES OF NICKEL + CHROMIUM + ΣX_i

REPORTED VALUES

Density**		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	Inconel	8.47*	529*
□	Inconel X	8.254*	515.3*
▽	Inconel X	8.25	515
△	Inconel	8.47	529
◁	Inconel	8.40	524
▷	Inconel X	8.20	512
◇	Hastelloy X	8.15	509
■	Evanohm	8.1	510
▲	19 Cr and 0.64 Si	8.35	521
▼	Hastelloy C	8.921	556.9
◀	17 Cr, 17 Mo, and 6 Fe	8.9	555.4

Melting Point		K	R
◀	Inconel X	1683 ± 15*	3030 ± 30*
▶	Inconel X	1555	2810
◆	30 Cr and 30 Mo	1553	2796
◑	40 Cr and 10 Mo	1633	2940
◧	22.5 each Cr and Mo	1563	2814
▲	36 Cr and 9 Mo	1588	2859
▼	28 Cr and 7 Mo	1673	3012
⊙	Inconel	1698	3056
◨	Inconel 702	1698	3056

*Most probable value for alloys of this composition.

**See the following figure for additional densities as a function of temperature.

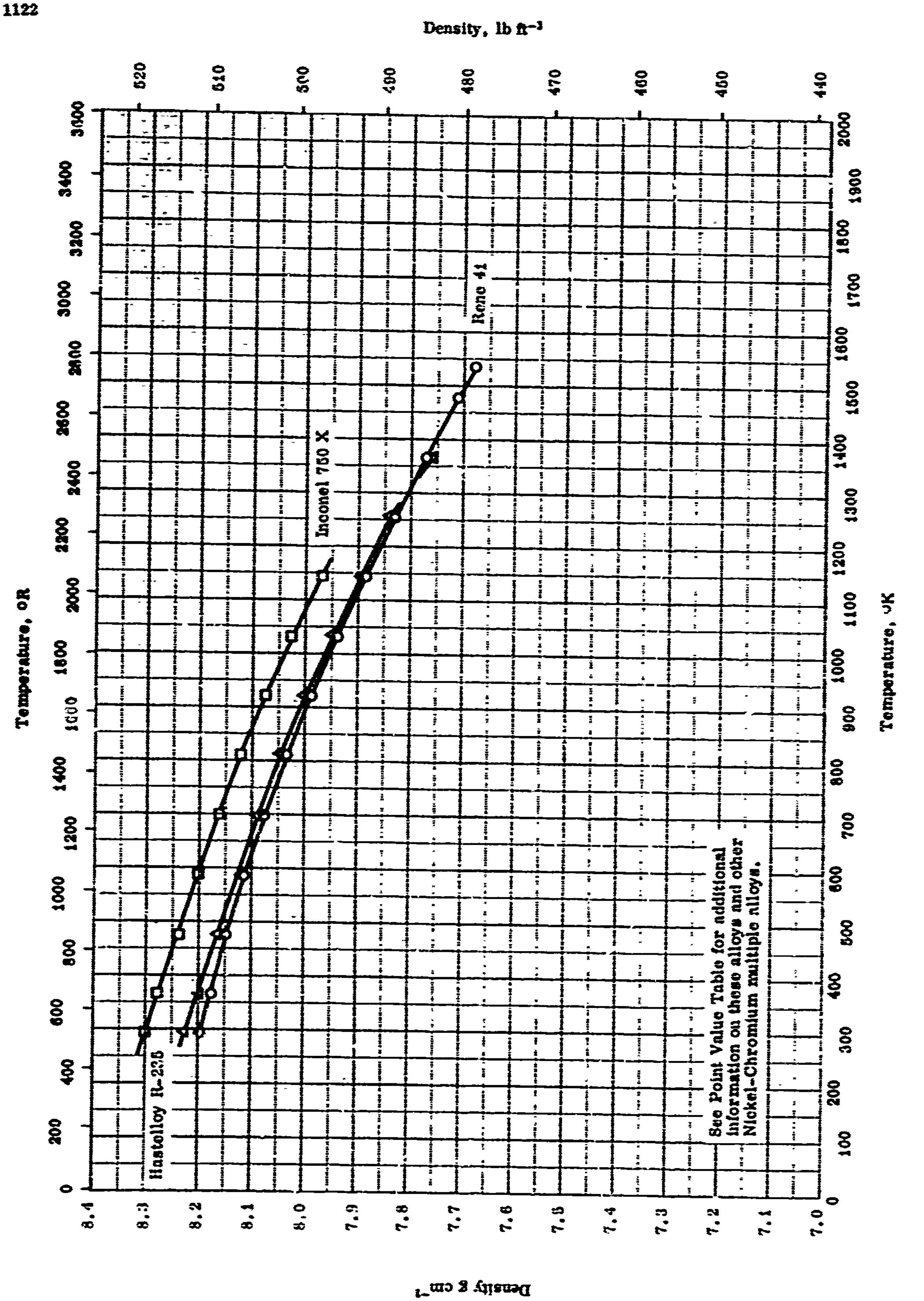
PROPERTIES OF NICKEL + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
■	48-3	298		Evanohm; 75 Ni, 20 Cr, 2.5 Al, and 2.5 Cu.	
▲	58-13	298		79.52 Ni, 19.33 Cr, 0.64 Si, 0.31 C, 0.17 Fe, 0.03 Mn, and traces P.	
▼	57-32	298		Hastelloy C; before test: 56.07 Ni, 15.83 Cr, 14.57 Mo, 4.94 Fe, 4.41 W, and 0.07 C, and after test: 56.00 Ni, 15.82 Cr, 14.53 Mo, 5.04 Fe, 4.49 W, and 0.068 C.	
◀	49-9	1617-1700		Inconel X.	
▶	55-31	1561		Inconel X; 73.19 Ni, 14.77 Cr, 8.60 Fe, 1.84 Ti, 0.95 each Cr and Ta, 0.47 Mo, 0.18 Al, and traces Cu, Ca, B, Zn.	M.P. by visual observation during manufacture.
◆	55-28	1653		40 Ni, 30 Cr, and 30 Mo.	Same as above except of powder in graphite crucible.
○	55-28	1633		50 Ni, 40 Cr, and 10 Mo.	Same as above.
□	55-28	1563		55 Ni, 22.5 Cr, and 22.5 Mo.	Same as above.
△	55-28	1588		55 Ni, 36 Cr, and 9 Mo.	Same as above.
▽	55-28	1673		65 Ni, 28 Cr, and 7 Mo.	Same as above.
◁	60-15	298		52 Ni, 17 Cr, 17 Mo, 6 Fe, 4.5 W, 2.5 ≈ Co, 1.0 ≈ Mn, 1.0 ≈ Si, 0.4 V, and 0.15 ≥ C.	
◐	63-17	1698		Inconel; 80 Ni, 14 Cr, and 6 Fe.	
◧	63-17	1698		Inconel 702; 80.9 Ni, 14 Cr, 2.0 Fe, 2.75 Al, 0.25 Ti, and 0.11C.	
				(continued onto next page)	

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	293		Inconel; nominal composition: 72 min Ni, 14-17 Cr, and 6-10 Fe.	Annealed; density by weight and volume by water displacement.
□	58-1	293		Inconel X; nominal composition: 70 Min Ni, 14-16 Cr, 5-9 Fe, 2.2 -2.75 Ti, 0.7-1.2 Nb, 0.4-1.0 Al. and 0.3-1.0 Mn.	Density measured same as above.
▽	51-6	293		Inconel X; 72.94 Ni, 14.65 Cr, 6.97 Fe, 2.44 Ti, 1.01 Nb, 0.93 Al, 0.54 Mn, 0.40 Si, 0.03 C, and 0.02 Cu.	Hot-rolled; solution heat treated 3 hrs at 2100 F, air cooled, double aged at 1550 F for 24 hrs and 1300 F for 20 hrs and then follow by air cooling after each aging.
△	51-6	293		Inconel; 78.92 Ni, 14.62 Cr, 5.80 Fe, 0.23 Mn, 0.19 Si, 0.09 C, and 0.007 S.	Hot-rolled, annealed 3 hrs at 1600 F, 15 min at 1800 F and air cooled.
◁	58-13	298		Inconel; 15.15 Cr, 8.24 Fe, 0.35 Ti, 0.30 Mn, 0.23 Si, 0.094Co, and 0.077 C.	
▷	58-13	298		Inconel X; 14.04 Cr, 7.93 Fe, 2.73 Ti, 0.67 Mn, 0.57 Nb, 0.56 Al, 0.41 Si, and 0.064 C.	
◇	58-13	298		Hastelloy X; 19.79 Cr, 17.95 Fe, 7.43 Mn, 1.58 Co, 0.86 Si, 0.81 Mn, 0.19 Ti, 0.13 W, and 0.11 C.	

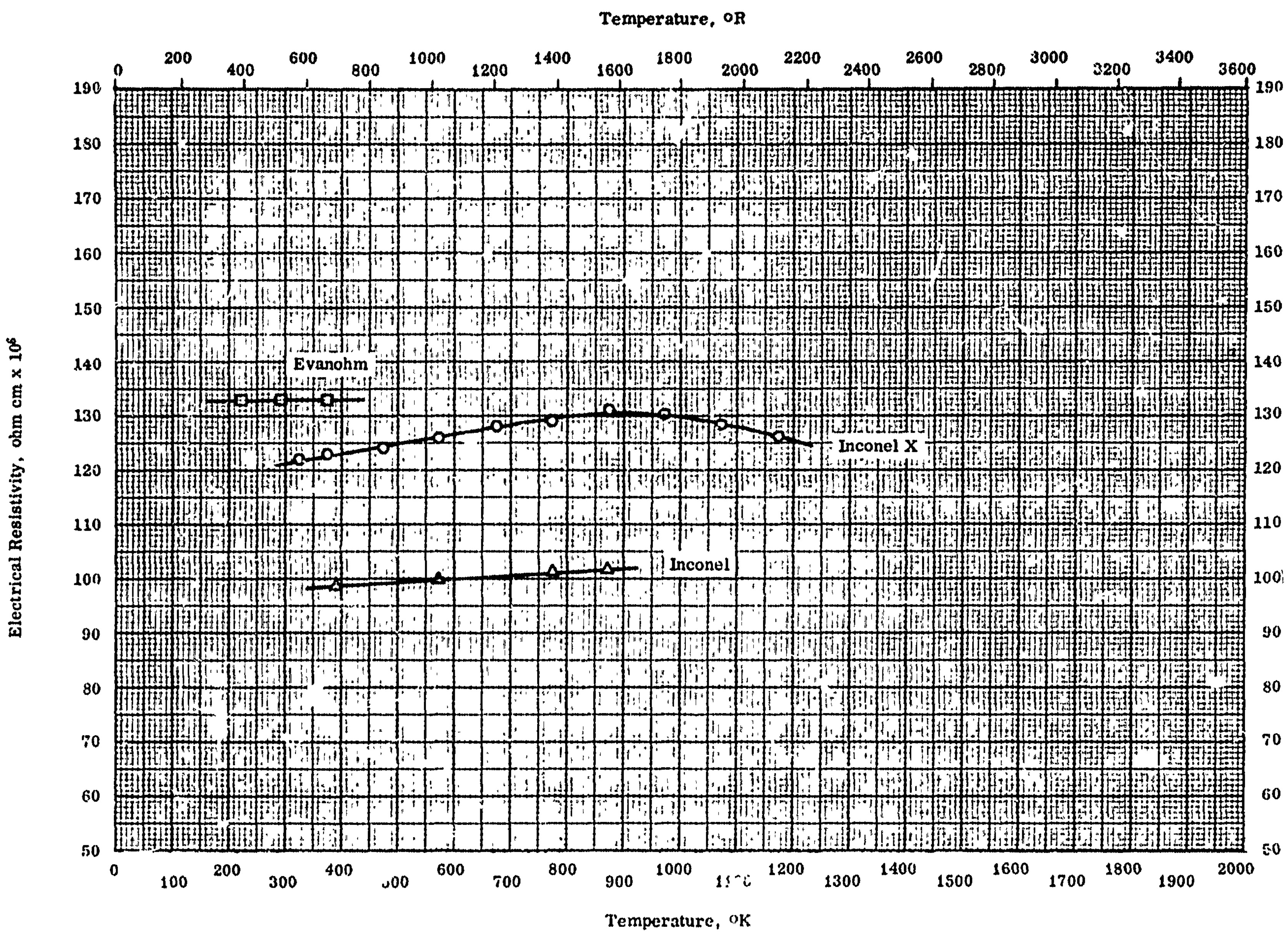


DENSITY -- NICKEL + CHROMIUM + ΣX_i

DENSITY -- NICKEL + CHROMIUM + ΣX_i

REFERENCE INFORMATION

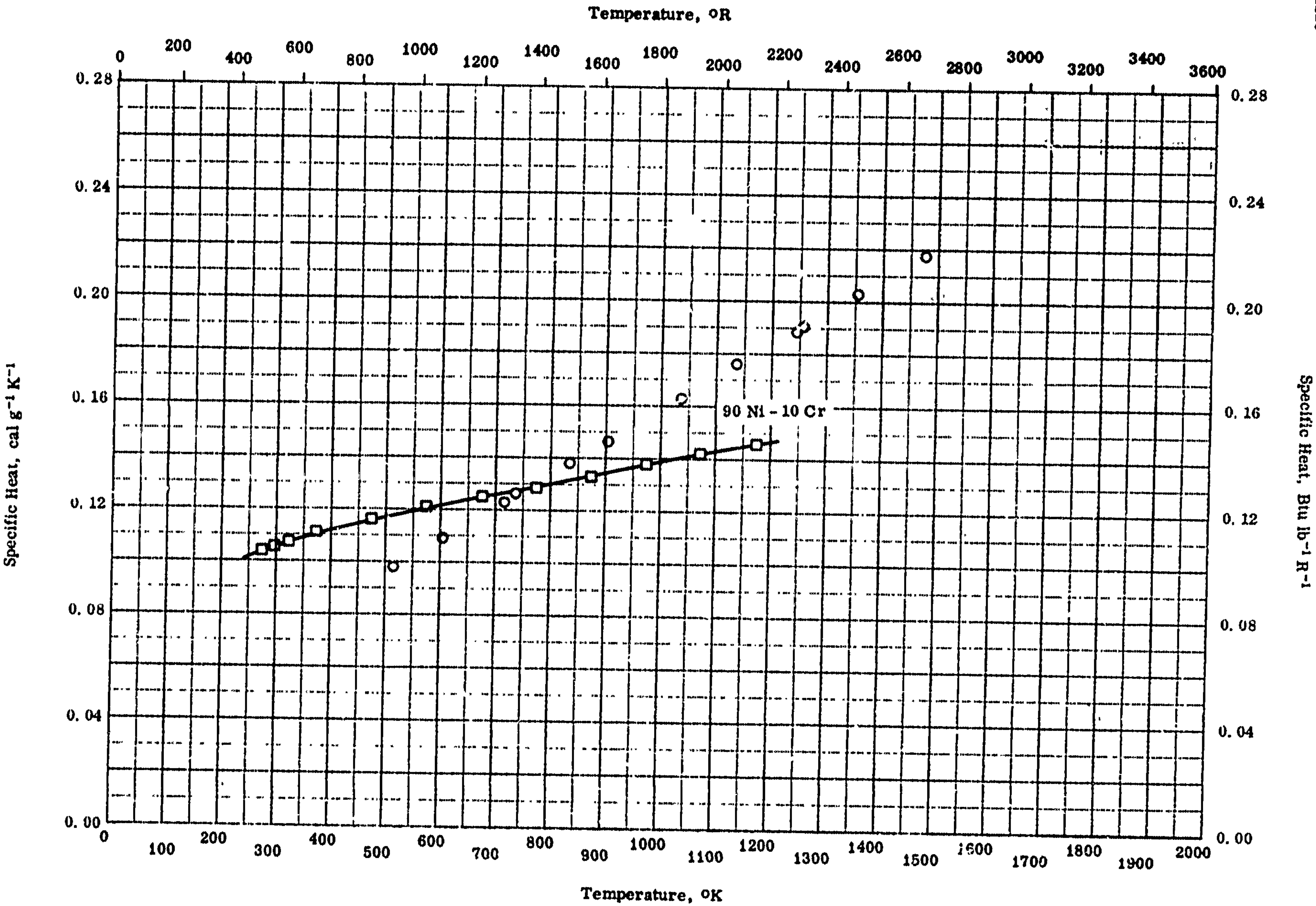
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-6	294-1533		Rene 41; 19 Cr, 11 Co, 10 Mo, 3 Ti, 3 Fe, 1.5 Al, and 0.1 C.	
□	59-3	294-1145		Inconel 750 X; 70 >Ni, 14-17 Cr, 5-9 Fe, 0.4-1.0 Al, 2.25-2.75 Ti, 0.7-1.2 Nb, 0.2 >Co, 0.5 > Si, and 0.08 >C.	
△	62-6	294-1366		Hastelloy R-235; 15.5 Cr, 10 Fe, 5.5 Mo, 2.5 Co, 2.5 Ti, 2 Al, 1 Mn, 1 Si, and 0.16 C.	



ELECTRICAL RESISTIVITY -- NICKEL + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-4	323-1173		Inconel X; 70< Ni, 14-16 Cr, 5-9 Fe, 2.25-2.75 Ti, 0.7-1.2 Nb, 0.4-1.0 Al, 0.3-1.0 Mn, 0.50 max. Si, 0.20 Cu, 0.08 C, and 0.01 S.	
□	48-3	222-375		Evanohm; 75 Ni, 20 Cr, 2.5 Al, and 2.5 Cu; density 506 lb ft^{-3}.	
△	61-21	293-873		Inconel; 79.5 Ni, 13.0 Cr, 6.5 Fe, and 0.08 C.	

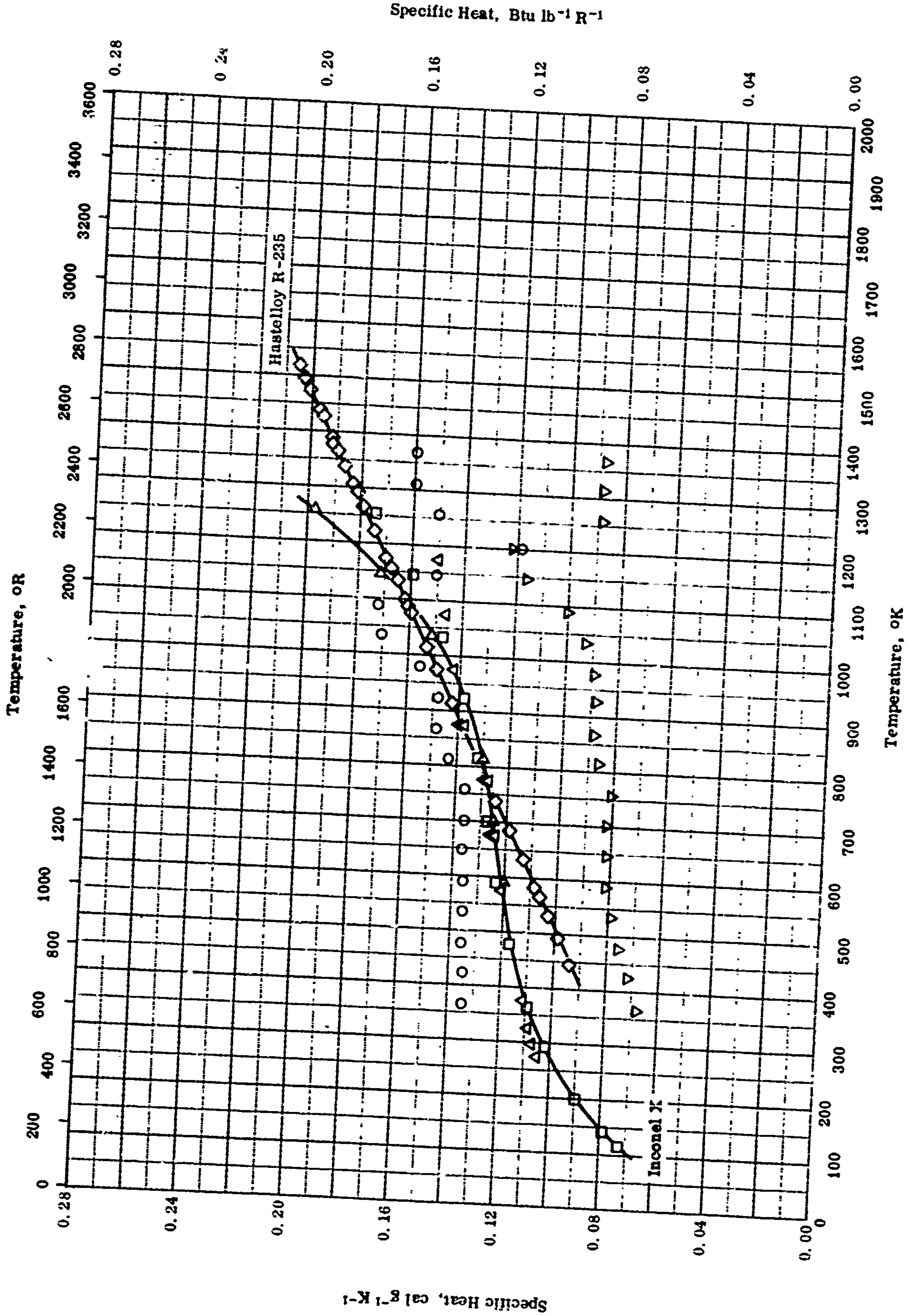


SPECIFIC HEAT -- NICKEL + CHROMIUM + ΣX_i
$(9 < Cr \leq 11)$

SPECIFIC HEAT -- NICKEL + CHROMIUM + ΣX_i
($9 < Cr \leq 11$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-2	513-1473	3.0	Inco 713 C, 71.53 Ni, 11.0 Cr, 6.5 Al, 5.0 Fe, 3.5 Mo, 1.0 (Nb + Ta), 1.0 Mn, 1.0 Si, 0.25 Ti, and 0.2 C; density 576 lb ft^{-3}.	Under Helium atmosphere.
□	61-16	273-1173	±3.0	90 Ni - 10 Cr; 89.1 Ni, 9.6 Cr, 0.63 Fe, 0.42 Si, 0.12 Zr, 0.08 Co, 0.01 Cu, and 0.01 Mn.	Unannealed; under Helium atmosphere.

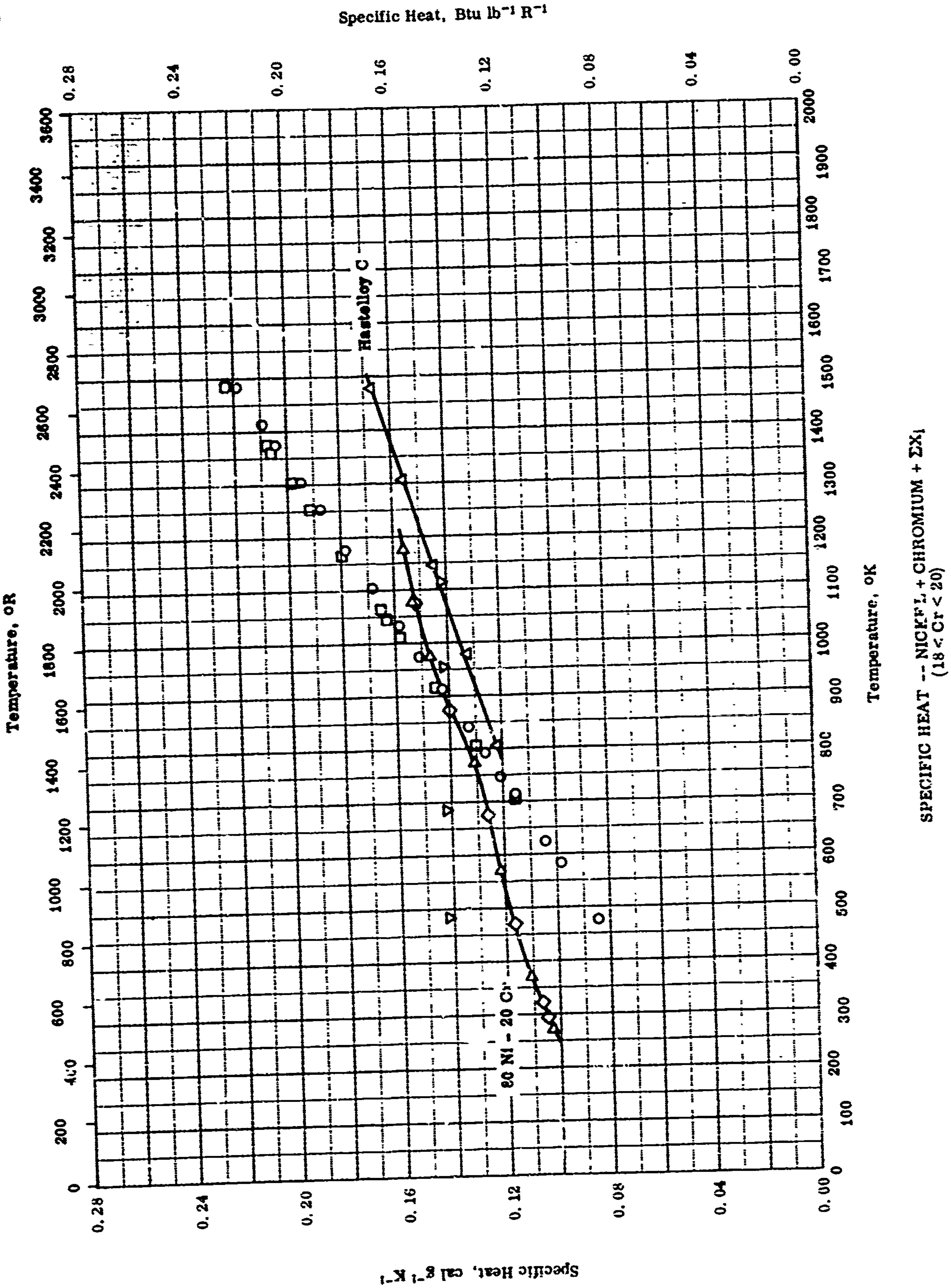


SPECIFIC HEAT — NICKEL + CHROMIUM + ΣX_i
($15 \le Cr < 16$)

SPECIFIC HEAT -- NICKEL + CHROMIUM + ΣX_i ($15 \le Cr < 16$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-14	366-1366	5-10	Inconel 702; nominal composition: 80 Ni, 15 Cr, 3.0 Al, 0.5 Ti, 0.35 Fe, and 0.05 C.	Heated to 1975 F for 1/2 hr and air cooled and again heated to 1400 F for 5 hrs and air cooled.
□	58-1 also 54-13	116-1255		Inconel; nominal composition: 78 Ni, 15 Cr, 7 Fe, 0.35 Mn, 0.2 Si, and 0.04 C; density 390 lb ft^{-3}.	Annealed 3 hrs at 1600 F, held for 15 min. at 1800 F, and then air cooled; sealed under helium atmosphere.
△	61-16	273-1173	±0.3	76 Ni, 15 Cr, and 9 Fe.	
▷	58-1	116-1255		Inconel X; nominal composition: 73 Ni, 15 Cr, 7 Fe, 2.5 Ti, 1.0 Nb, 0.9 Al, 0.7 Mn, 0.4 Si, and 0.04 C; density 380 lb ft^{-3} at 32 F.	Solution heat-treated 3 hrs at 2100 F, air cooled, double aged 24 hrs at 1550 F and then air cooled, and finally held 20 hrs at 1300 F and air cooled; sealed under helium atmosphere.
▽	59-14	366-1366	5-10	Inconel X; nominal composition: 70.0 ≤ Ni, 15.0 Cr, 7.0 Fe, 2.5 Ti, 0.95 Nb, 0.70 Al, 0.02 ≥ Cu, and 0.08 ≥ C.	Heated 2 hrs at 2100 F, air cooled, heated 24 hrs at 1550 F, air cooled, and finally heated 20 hrs at 1300 F and then air cooled.
◇	58-7 also 59-13	390-1514	0.66-2.3	Hastelloy R-235; nominal composition: 66.85 Ni, 15.5 Cu, 10 Fe, 5 Mo, 2.5 Ti, and 0.15 C.	Under helium atmosphere.

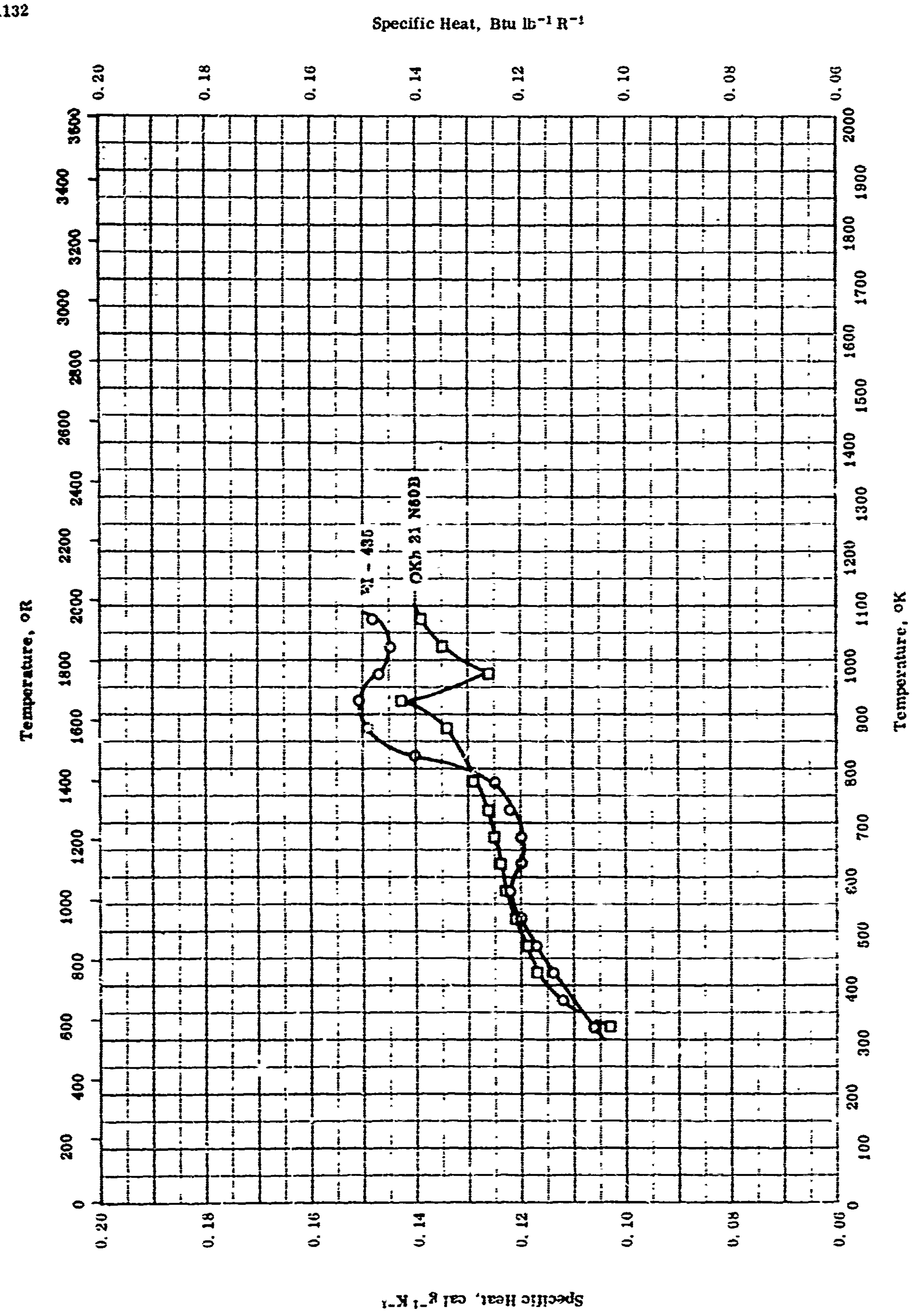


SPECIFIC HEAT -- NICKEL + CHROMIUM + ΣX_i
$(18 < Cr < 20)$

SPECIFIC HEAT — NICKEL + CHROMIUM + ΣX_i
($18 < Cr < 20$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-2	479-1483	3.0	Rene 41, GE-J1610; 54.60 Ni, 18.6 Cr, 10.73 Cu, 9.63 Mo, 3.14 Ti, 1.54 Fe, 1.49 Al, 0.11 C, 0.08 Mn, 0.07 Si.	Solution heat treated at 1975 F and water quenched; under helium atmosphere.
□	61-2	479-1483	3.0	M252, GE-J1500; 57.15 Ni, 18.65 Cr, 9.98 Mo, 9.75 Cu, 2.74 Ti, 1.17 Al, < 0.2 Fe, 0.12 C, 0.07 Mn, 0.06 Si; density 512 lb ft^{-3}.	Same as above.
△	58-2	770-1460		Hastelloy C; before test: 56.07 Ni, 18.83 Cr, 14.57 Mo, 4.94 Fe, 4.41 W, 0.070 C, after test: 56.00 Ni, 15.82 Cr, 14.53 Mo, 5.04 Fe, 4.49 W, 0.068 C; density 556.9 lb ft^{-3}.	
◇	61-16	273-1173	± 0.3	80 Ni-20 Cr; 77.4 Ni, 19.5 Cr, 1.4 Si, 0.59 Mn, 0.45 Fe, 0.04 C.	
▷	53-12 also 56-16	273-1173	± 2.0	Nichrome V; 77.4 Ni, 19.5 Cr, 1.4 Si, 0.59 Mn, 0.45 Fe, 0.04 C.	
▽	53-14	484-1113		Brazing compound, GEH62-V; 70.3 Ni, 19.5 Cr, 11.2 Si.	

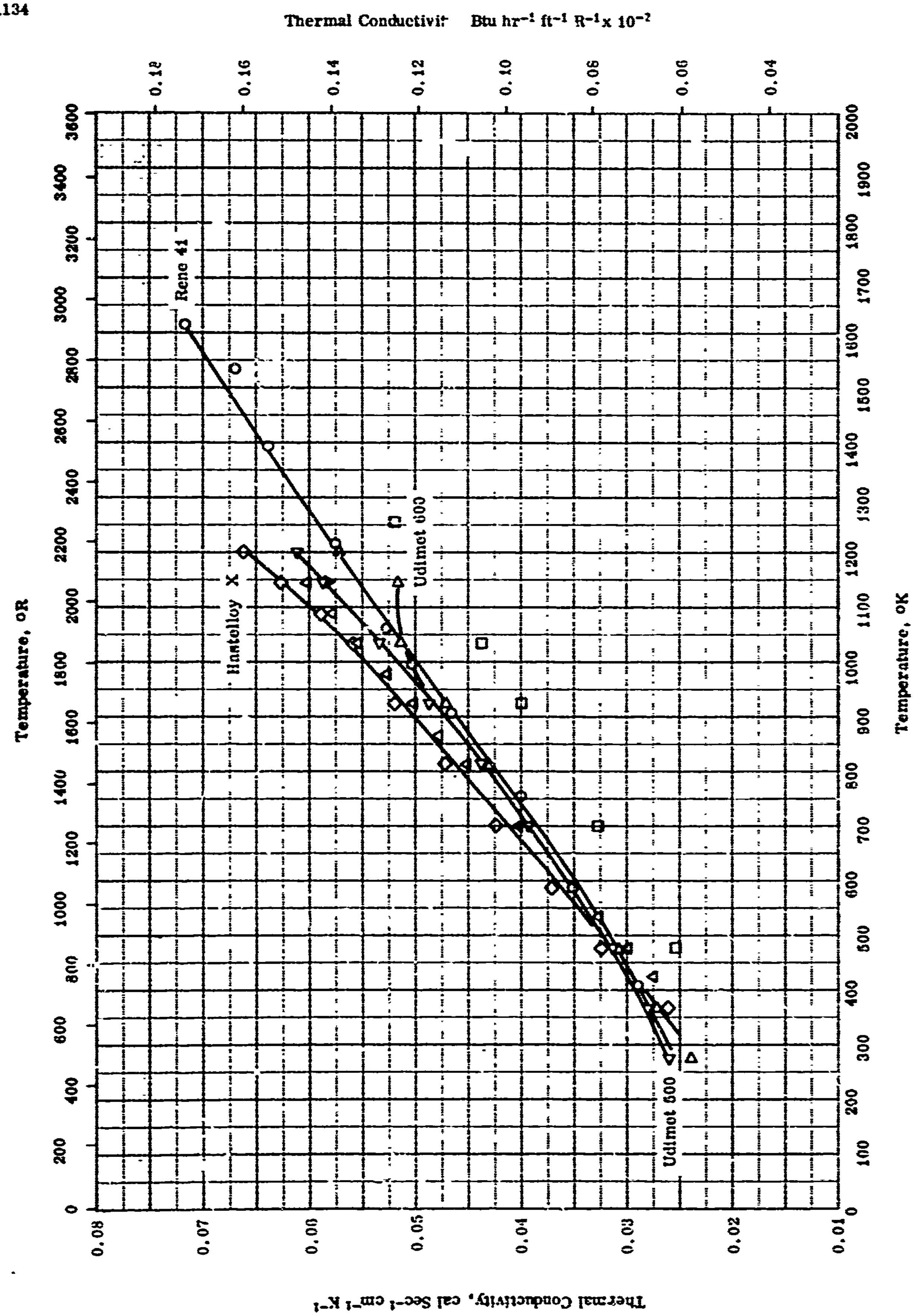


SPECIFIC HEAT — NICKEL + CHROMIUM + ΣX_i
($Cr > 20$)

SPECIFIC HEAT -- NICKEL + CHROMIUM + ΣX_i
(Cr >20)

REFERENCE INFORMATION

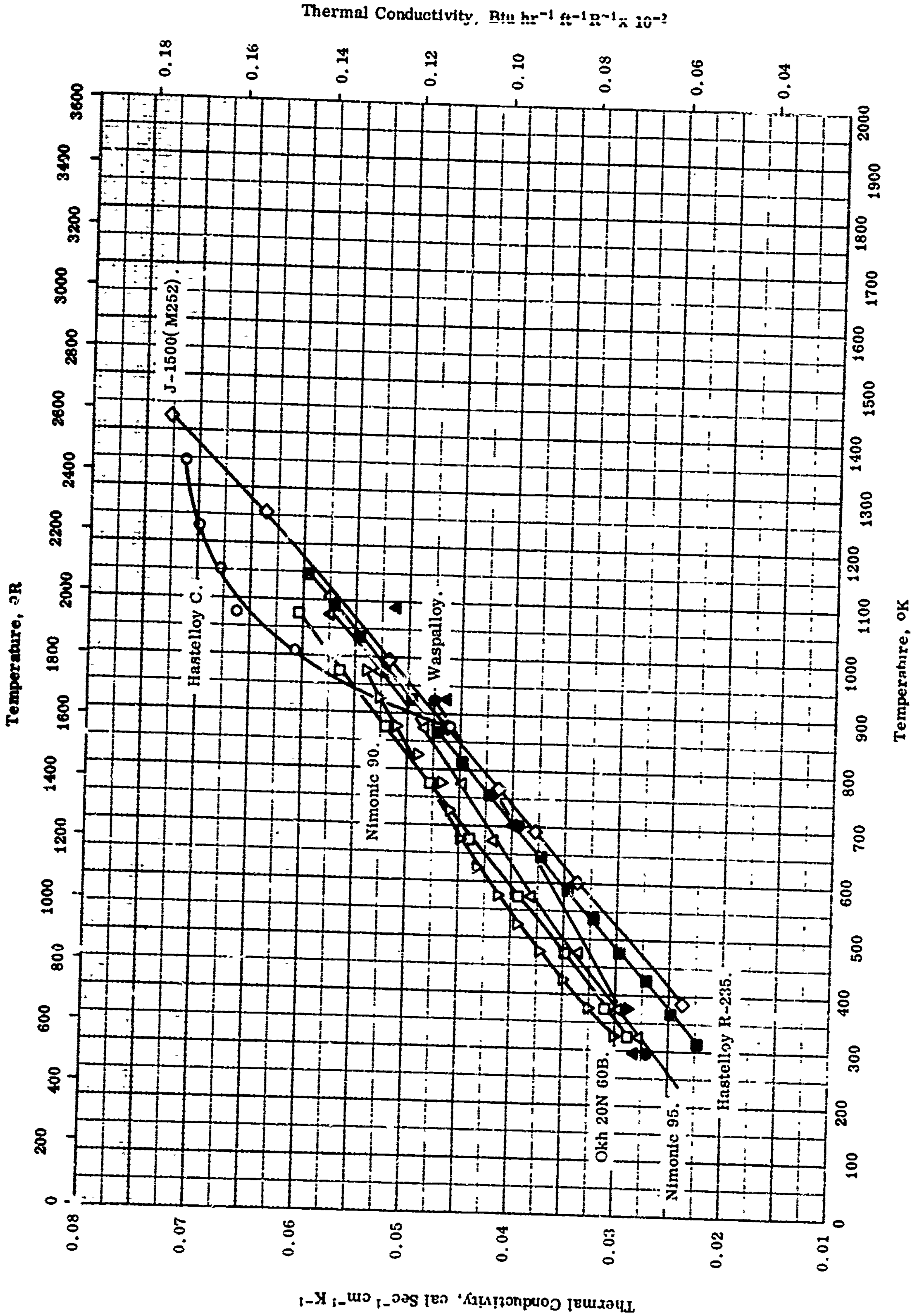
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-2	293-1173	± 1.0	OKh21N78T[EI-435]; 77.220 Ni, 21.1 Cr, 0.56 Fe, 0.49 Mn, 0.32 Si, 0.23 Ti, 0.06 C, 0.006 S, 0.005 P, and trace of Cu.	Quenched in water from 1100 C.
□	63-2	293-1173	± 1.0	OKh20N60B; 59.64 Ni, 20.4 Cr, 17.7 Fe, 1.59 Mn, 0.58 Nb, 0.25 Si, 0.06 C, and 0.004 S.	Quenched in water from 1050 C and tempered 1 hr in air at 720 C.



THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
(Ni ≤ 55)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-2	400-1617	<5	Rene 41; 54.0 Ni, 18.0 Cr, 10.73 Cu, 9.63 Mo, 3.14 Ti, 1.54 Fe, 1.49 Al, 0.11 C, 0.08 Mn, and 0.07 Si.	Sample contained 5 one-inch dia disks.
□	63-6	478-1255		Same as above.	
△	59-7	422-1144		Rene 41 (J-1610); 55 Ni, 19 Cr, 11 Co, 10 Mo, 3.1 Ti, 1.5 Al, and 0.09 C; density 0.298 lb in^{-3}.	
▼	60-8	1144		Udimet 500; 50.59 Ni, 17.5 Cr, 16.5 Co, 4.0 Fe, 4.0 Mo, 3.0 Ti, 2.75 Al, 0.75 Mn, 0.75 Si, 0.15 C, and 0.008 B.	Wrought form.
◁	60-9	273-1200		Udimet 500; 50 Ni, 17.5 Cr, 16.5 Co, 4.0 Fe, 4.0 Mo, 3.0 Al, 3.0 Ti, 0.75 Mn, 0.75 Si, 0.15 C, 0.15 S, and 0.008 B; density 0.290 lb in^{-3}.	
▷	60-9	273-1200		Udimet 500; 50 Ni, 17.5 Cr, 16.5 Co, 4.2 Al, 4.0 Fe, 4.0 Mo, 3.0 Ti, and 0.10 C; density 0.280 lb in^{-3}.	
◇	58-12	366-1200		Hastelloy X; 48.4 Ni, 22.0 Cr, 18.5 Fe, 9.0 Mo, 1.5 max Co, and 0.6 W.	

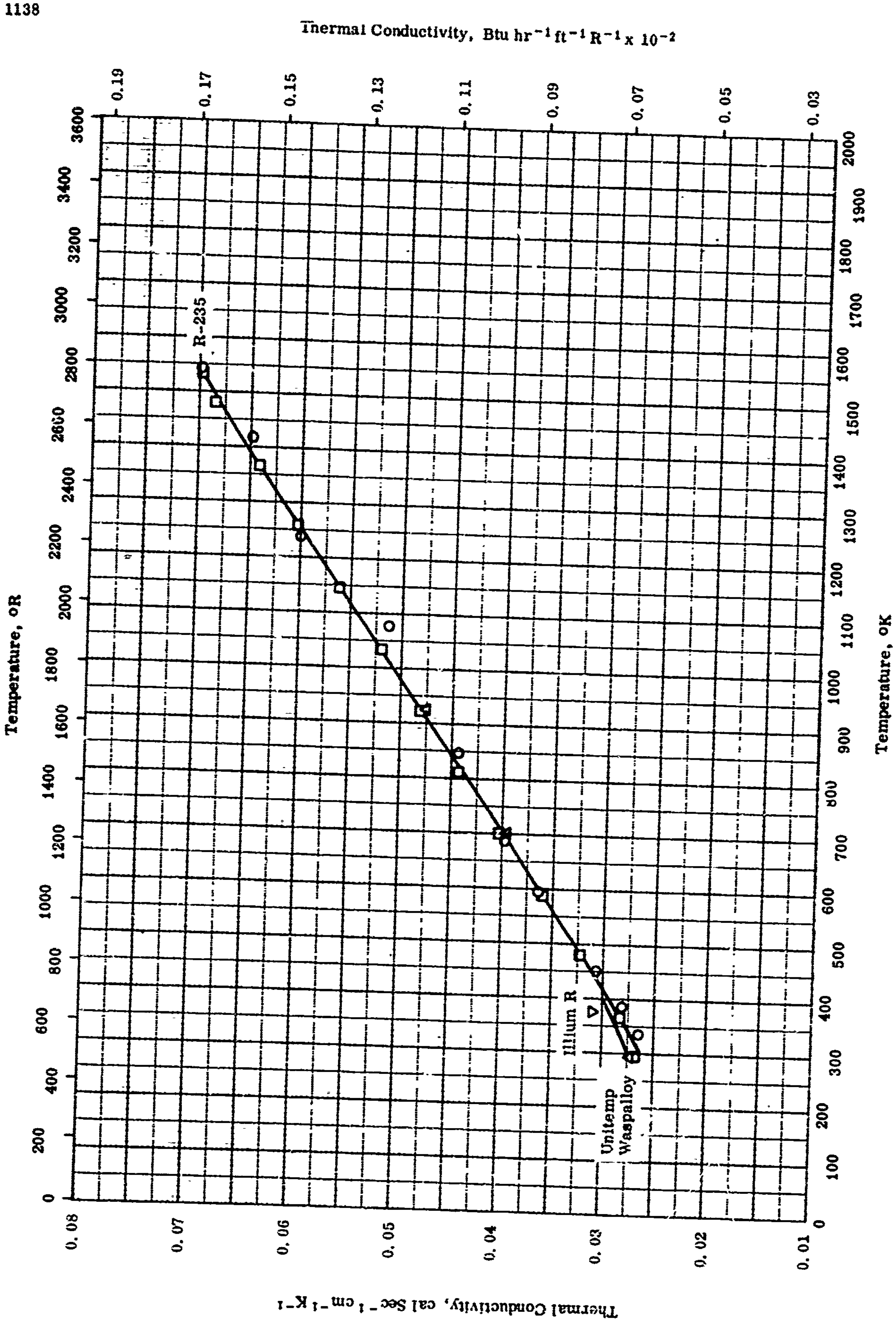


THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($55 < Ni < 60$)

THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($55 < Ni < 60$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-2	876-1348	5	Hastelloy C; 56.07 Ni, 15.83 Cr, 14.57 Mo, 4.94 Fe, 4.41 W, and 0.07 C.	
□	60-6	323-1073		Nimonic 90; 58.86 Ni, 19.5 Cr, 16.5 Co, 2.45 Ti, 1.40 Al, 0.65 Si, 0.41 Fe, 0.14 Cu, 0.06 C, and 0.03 Mn.	
△	60-6	323-1073		Nimonic 95; 57.71 Ni, 19.1 Cr, 16.5 Co, 2.91 Ti, 1.99 Al, 0.65 Si, 0.38 Fe, 0.10 C, 0.06 Cu, and 0.06 Mn.	
▽	63-2	323-973	± 2	Okh 20 N 60 B (USSR design.); 59.64 Ni, 20.4 Cr, 17.7 Fe, 1.59 Mn, 0.58 Nb, 0.25 Si, 0.06 C, and 0.004 S.	Quenched in water from 1050 C and then tempered in air at 720 C for 1 hr.
◇	61-2	386-1427	< 5	M 252; 57.15 Ni, 18.65 Cr, 9.98 Mo, 9.75 Co, 2.74 Ti, 1.17 Al, 0.3 >Fe, 0.12 C, 0.07 Mn, and 0.06 Si.	Sample contained 5 one-inch dia disks.
▼	58-11	373		Illium G; 56.0 Ni, 22.5 Cr, 6.5 Cu, 6.5 Fe, 6.4 Mo, 1.25 Mn, 0.65 Si, and 0.2 C.	
▲	57-11	294-1089		J-1500 (M-252); 55.85 Ni, 20 Cr, 10 Co, 10 Mo, 3 Ti, 1 Al, and 0.15 C; density 0.298 lb in^{-3}.	
●	59-6	294-922		Waspalloy; 57.0 Ni, 19.75 Cr, 13.5 Co, 4.5 Mo, 3.0 Ti, 1.35 Al, 0.75 Fe, 0.07 C, 0.06 Zr, 0.04 Si, 0.02 Mn, 0.007 S, and 0.005 B; density 0.296 lb in^{-3}.	
■	58-16	311-1144		Hastelloy R-235; 59.8 Ni, 15.5 Cr, 10 Fe, 5.5 Mo, 2.5 Co, 2.5 Ti, 2 Al, 1 Mn, 1 Si, and 0.16 C; density 0.296 lb in^{-3}.	

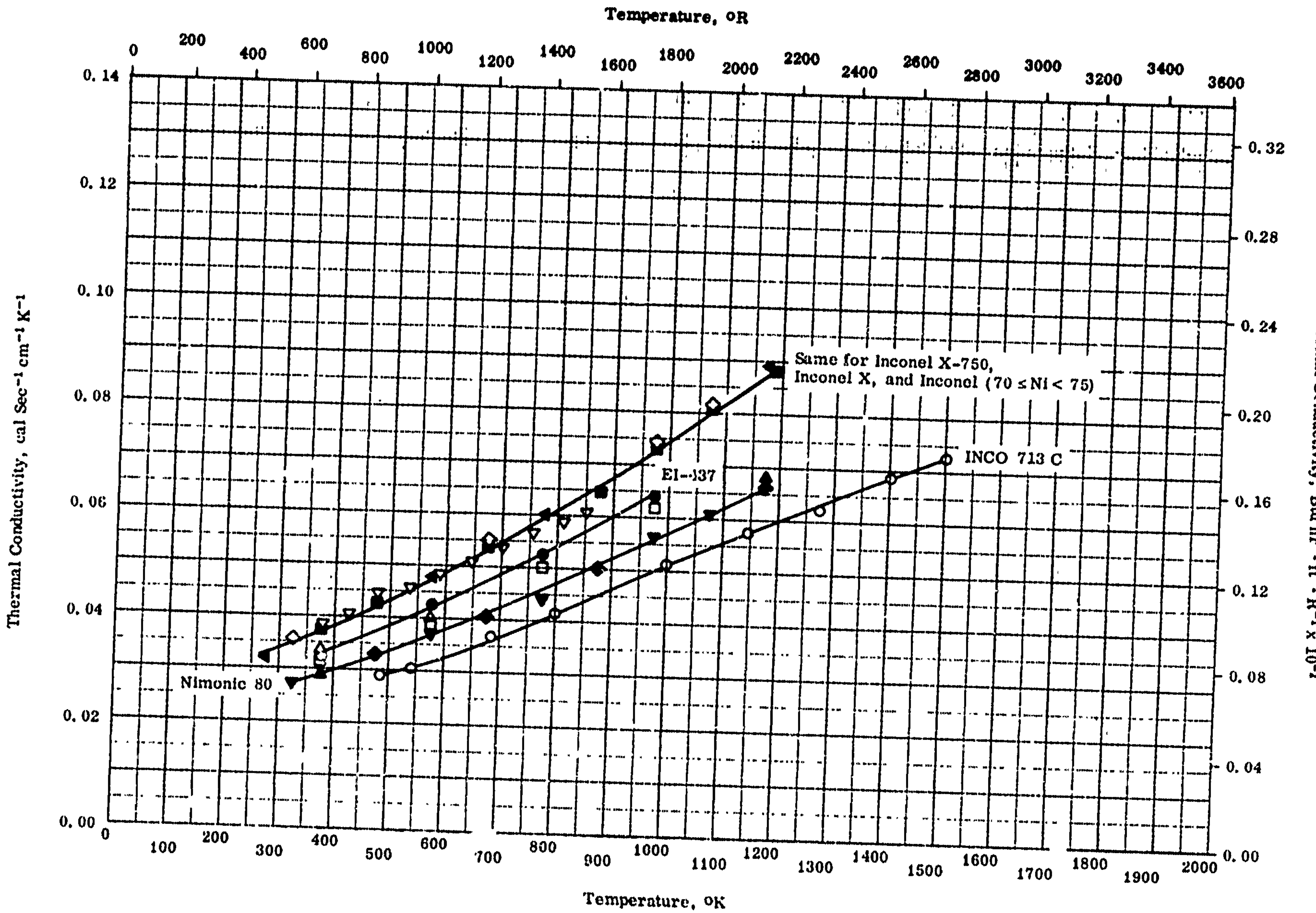


THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($60 \leq Ni < 70$)

THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($60 \le Ni < 70$)

REFERENCE INFORMATION

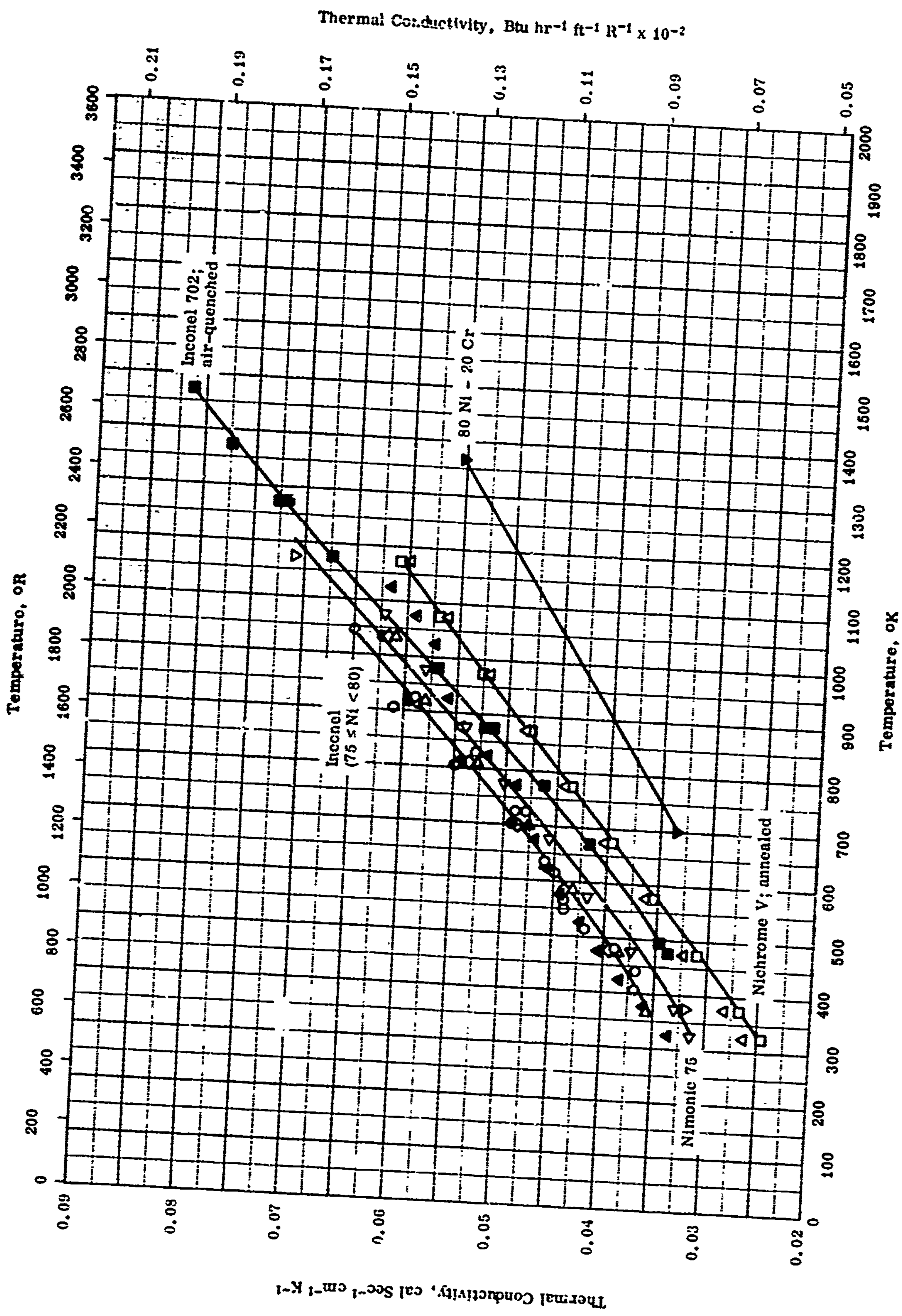
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-7	336-1544		Hastelloy R235; 14-17 Cr, 9-11 Fe, 4.5-6.5 Mo, 2.25-2.75 Ti, 1.75-2.25 Al, and 2.5 max Co.	Measured in He atm.
□	62-6	372-1478		Same as above.	
△	61-5	294-922		Unitemp Waspalloy; 60.61 min Ni, 18-21 Cr, 12-15 Co, 3-5 Mo, 2.75-3.25 Ti, 2.0 max Fe, 1.0-1.5 Al, 0.75 Si, 0.5 Mn, 0.1 max C, 0.1 max Cu, 0.02-0.15 Zr, 0.03 max S, and 0.001-0.01 B.	
▽	58-11	373		Illium R; 64 Ni, 22 Cr, 6.0 Fe, 5.0 Mo, 2.5 Cu, 0.3 Mn, 0.15 Si, and 0.05 C.	



THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($70 \le Ni < 75$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-2	486-1501	< 5	INCO 713 C; 71.53 Ni, 11.0 Cr, 6.5 Al, 5.0 Fe, 3.5 Mo, 1.0 Mn, 1.0 Si, 1.0 Nb + Ta, 0.25 Ti, and 0.20 C.	Sample contained 5 one-inch dia disks.
■	59-3	322-1172		Inconel X 750; 70 min Ni, 14-17 Cr, 5-9 Fe, 2.25-2.75 Ti, 1.20 max Mn, 0.7-1.2 Nb, 0.4-1.0 Al, 0.5 max Cu, 0.5 max Si, 0.2 max Co, and 0.08 max C.	
▲	56-3	373-1173		Nimonic 80/80A; 71 Ni, 20 Cr, 5.0 Fe, 1.8-2.7 Ti, 0.5-1.8 Al, 1.0 max Mn, 1.0 max Si, 0.2 max Cu, and 0.1 max C.	
▽	57-6	378-850		Inconel X; 73 Ni, 15 Cr, 7.0 Fe, 2.5 Ti, 1.0 Nb, 0.7 Al, 0.5 Mn, 0.4 Si, and 0.04 C; nominal composition from Metal's Handbook.	
◇	59-5	323-1173		Same as above.	
●	58-9	373-973	3.0	EI-437 (USSR design.); 74.5 Ni, 20.9 Cr, 2.28 Ti, 0.70 Si, 0.46 Mn, 0.40 Al, and 0.05 C.	
□	58-9	373-973	3.0	Same as above.	Tempered at 950 C for 100 hrs.
△	58-9	373-973	3.0	Same as above.	Tempered at 850 C for 2000 hrs.
▼	60-6	323-1173		Nimonic 80; 73.66 Ni, 21.0 Cr, 2.5 Ti, 1.20 Al, 0.6 Mn, 0.5 Fe, 0.5 Si, and 0.04 C.	
◆	52-5	373-1173		Nimonic 80; 72.8 Ni, 21.4 Cr, 3.08 Fe, 2.34 Ti, and 0.38 Al.	Heat to 1080 C for 8 hrs and aged at 700 C.
◀	50-4	273-1173		Inconel; 73.19 Ni, 14.38 Cr, 6.96 Fe, 0.83 Al, 0.47 Mn, 0.39 Si, 0.03 C, 0.03 Cu, and 0.007 S.	



THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($75 \le Ni < 80$)

THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
($75 \leq Ni < 80$)

REFERENCE INFORMATION

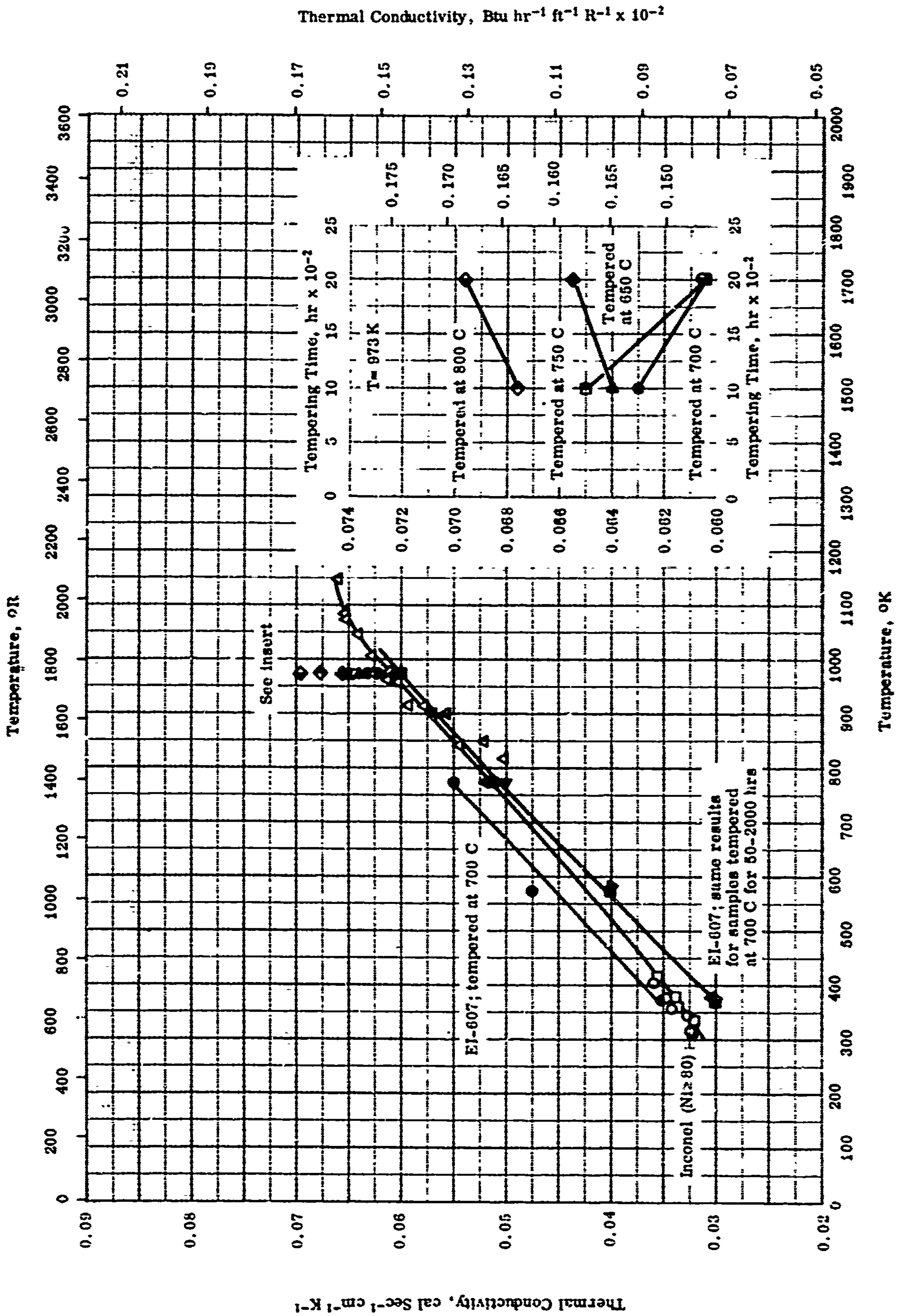
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-4	405-1044	4	Inconel; 75.92 Ni, 15.38 Cr, and 8.70 Fe.	In wrought form.
□	53-2	323-1173	2	Nichrome V; 77.94 Ni, 19.87 Cr, 1.44 Si, 0.06 Mn, and 0.036 Fe.	Annealed at 950 C.
△	53-2	323-1173	2	Inconel; 78.13 Ni, 13.94 Cr, 6.33 Fe, 0.33 Si, 0.32 Mn, and 0.30 Co.	Annealed at 1050 C.
▽	55-3	373-1173		Nimonic 75; 20 Ni, 2.4 Fe, 1.0 max Mn, 1.0 max Si, 0.5 max Cu, 0.2-0.6 Ti, and 0.08-0.15 C.	
◁	60-6	323-1073		Nimonic 75; 77.87 Ni, 20.53 Cr, 0.79 Si, 0.27 Mn, 0.23 Ti, 0.126 C, 0.12 Fe, and 0.06 Cu.	
▷	55-4	366-1033	±7	Inconel; 75.99 Ni, 14.42 Cr, 8.87 Fe, 0.28 Mn, 0.22 Cu, 0.17 Si, 0.02 C, and 0.007 S; Rockwell superficial hardness (15 T scale) 78.	Annealed at 2050 F followed by cooling in quiescent air.
◇	55-4	366-1033	±5	Inconel; 76.45 Ni, 14.96 Cr, 7.89 Fe, 0.26 Mn, 0.19 Si, 0.15 Cu, 0.07 C, and 0.007 S; Rockwell superficial hardness (15 T scale) 80.	Same as above.
●	55-4	366-1033	±5	Inconel; 75.64 Ni, 15.32 Cr, 8.17 Fe, 0.33 Mn, 0.21 Si, 0.19 Cu, 0.11 C, and 0.007 S; Rockwell superficial hardness (15 T scale) 83.	Same as above.
■	62-10	473-1473		Inconel 702; 79.3 Ni, 17.0 Cr, 2.5 Al, 0.59 Ti, 0.36 Fe, 0.19 Si, 0.14 Cu, 0.08 Co, 0.066 C, and 0.0[illegible] Mn.	Heated at 1080 C for 1 hr and air-cooled rapidly; machined into a right cylinder with recesses at either end.

(Continued onto next page)

THERMAL CONDUCTIVITY — NICKEL + CHROMIUM + ΣX_i (Continued)
($75 \leq Ni < 80$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▲	63-2	323-1123	12	EI-435 (USSR design.); 77.33 Ni, 21.1 Cr, 0.56 Fe, 0.49 Mn, 0.32 Si, 0.23 Ti, 0.06 C, 0.006 S, 0.005 P, and trace of Cu.	Water-quenched from 1100 C.
▼	58-13	700-1367	10	80 Ni-20 Cr; 79.52 Ni, 19.33 Cr, 0.64 Si, 0.31 C, 0.17 Fe, 0.03 Mn, and trace P; density 8.35 $g\,cm^{-3}$.	



THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i (Ni ≥ 80)

THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i
(Ni ≥ 80)

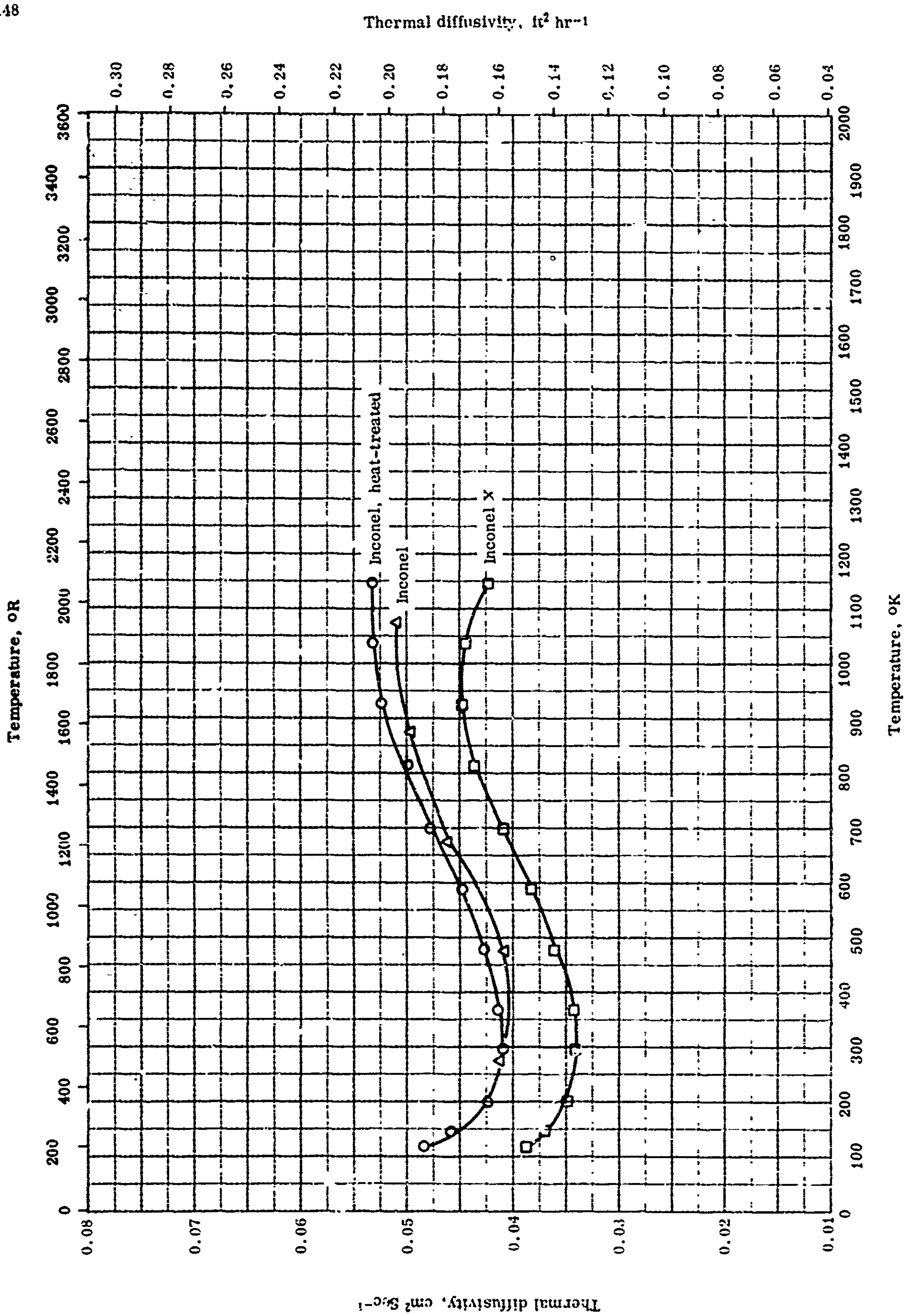
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-7	317-407	±5	Inconel; 80 Ni, 15 Cr, and 5 Fe; nominal composition from Metal's Handbook.	
□	53-7	317-417	±5	Same as above.	
△	58-8	818-1149		Same as above.	
▼	58-9	973	3.0	EI-607 (USSR design.); 80.95 Ni, 15.4 Cr, 1.67 Nb, 0.55 Al, 0.50 Mn, 0.49 Ti, 0.42 Si, and 0.02 C.	Heated to 1100 C for 5 hrs and water-quenched.
◁	58-9	973	3.0	Same as above.	The above sample again heated to 1000 C for 2 hrs and air-cooled.
▷	58-9	973	3.0	Same as above.	The above sample again heated to 900 C for 1 hr and at 800 C for 2 hrs.
◇	58-9	973	3.0	Same as above.	The above sample heated again at 750 C for 20 hrs.
●	58-9	373-973	3.0	Same as above.	Tempered at 700 C.
■	58-9	373-973	3.0	Same as above.	The above sample again tempered at 700 C for 50 hrs.
▲	58-9	373-973	3.0	Same as above.	The above sample again tempered at 700 C for 200 hrs.
▽	58-9	373-973	3.0	Same as above.	The above sample again tempered at 700 C for 1000 hrs.
◀	58-9	373-973	3.0	Same as above.	The above sample again tempered at 700 C for 2000 hrs.
				(Continued onto next page)	

THERMAL CONDUCTIVITY -- NICKEL + CHROMIUM + ΣX_i (Continued)
(Ni ≥ 80)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▶	58-9	973	3.0	Same as above.	Tempered at 650 C for 1000 hrs.
◆	58-9	973	3.0	Same as above.	Tempered at 650 C for 2000 hrs.
◐	58-9	973	3.0	Same as above.	Tempered at 700 C for 1000 hrs.
◑	58-9	973	3.0	Same as above.	Tempered at 700 C for 2000 hrs.
◧	58-9	973	3.0	Same as above.	Tempered at 750 C for 1000 hrs.
◨	58-9	973	3.0	Same as above.	Tempered at 750 C for 2000 hrs.
◈	58-9	973	3.0	Same as above.	Tempered at 800 C for 1000 hrs.
◈	58-9	973	3.0	Same as above.	Tempered at 800 C for 2000 hrs.

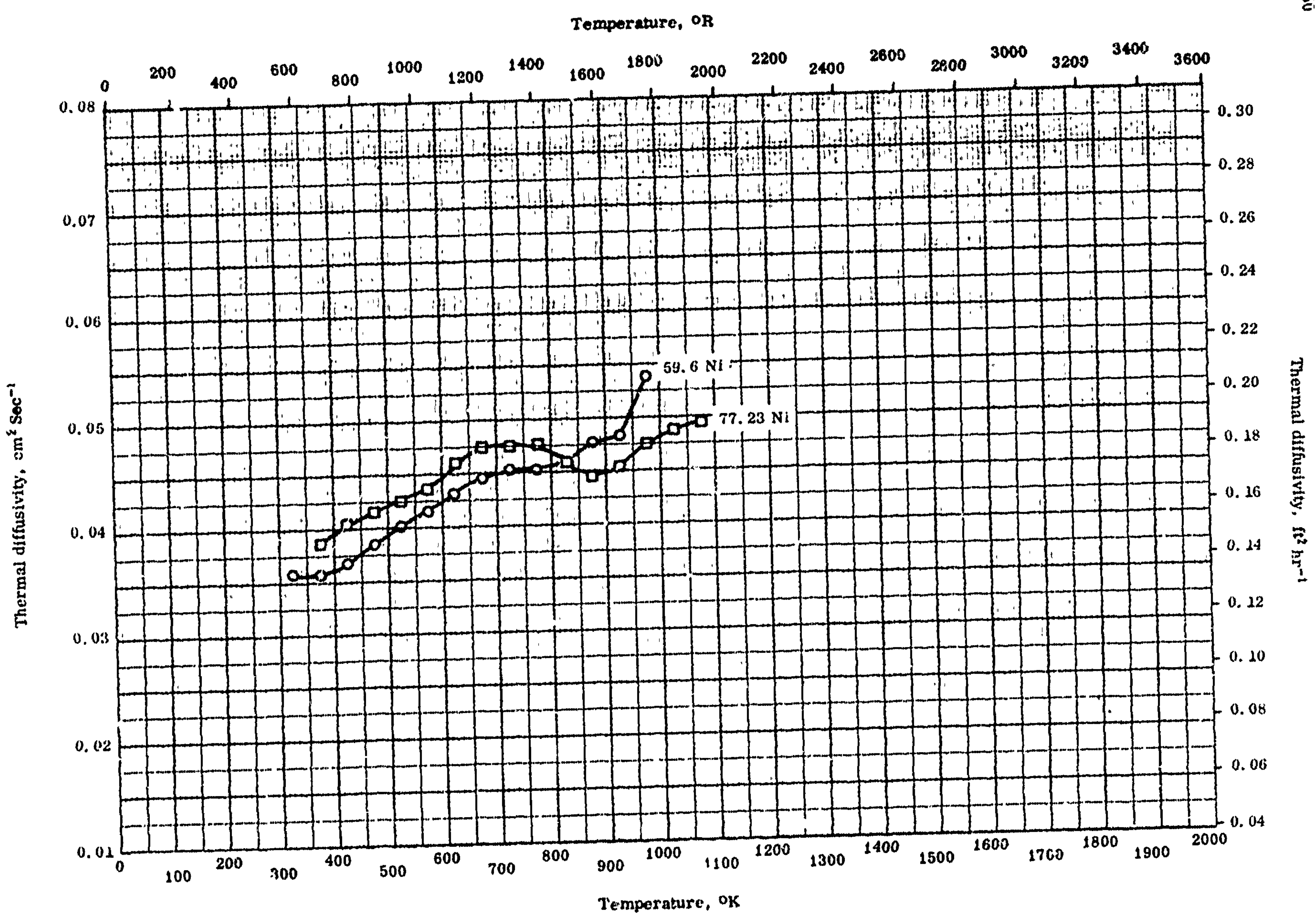


THERMAL DIFFUSIVITY -- NICKEL + CHROMIUM + ΣX_i
(Inconel)

THERMAL DIFFUSIVITY -- NICKEL + CHROMIUM + ΣX_i
(Inconel)

REFERENCE INFORMATION

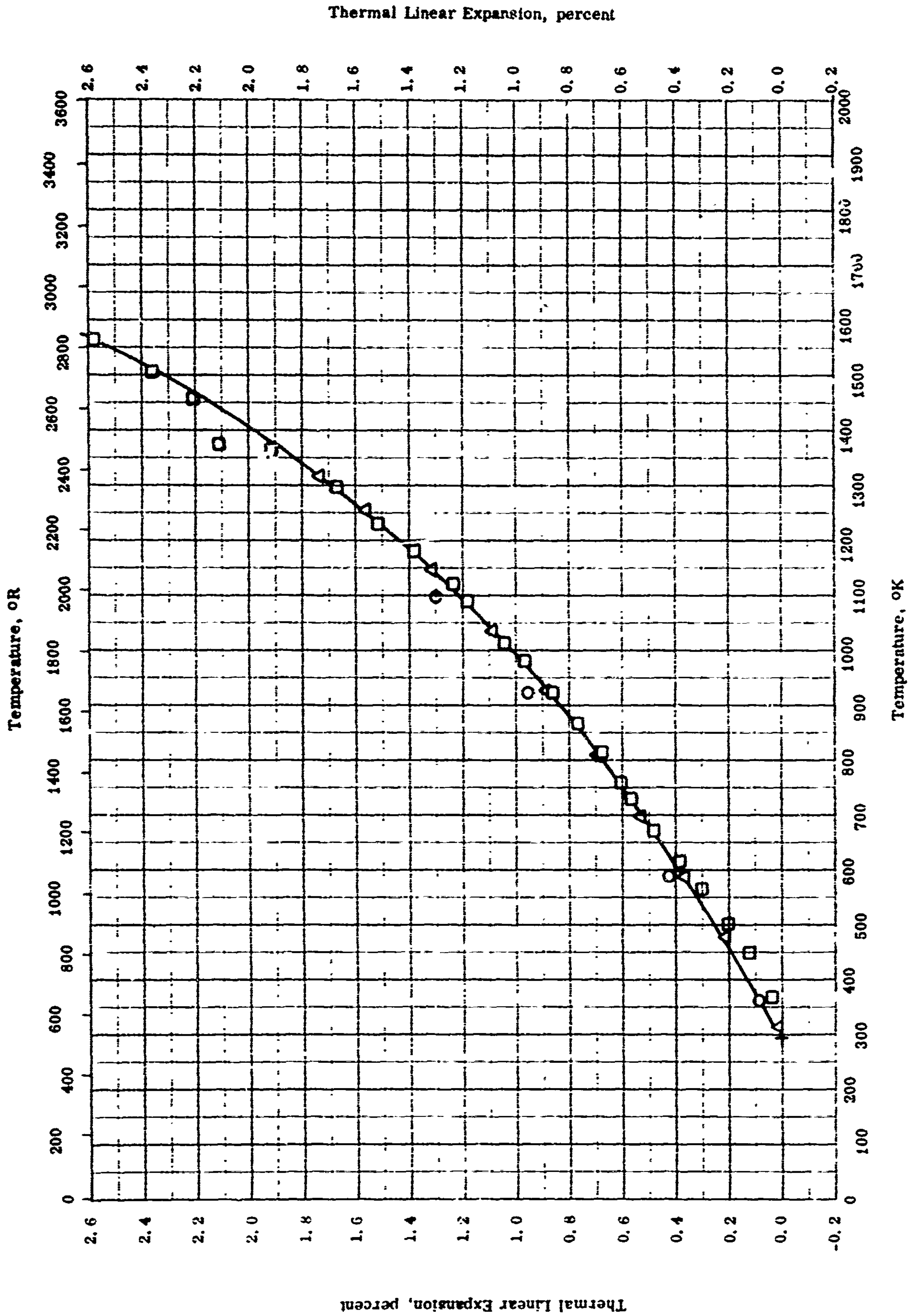
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	56-1	273-1073		Inconel; 78 Ni, 15 Cr, 7 Fe, 0.35 Mn, 0.20 Si, and 0.04 C.	
○	58-1	116-1144		Inconel; 78.92 Ni, [illegible].62 Cr, 5.8 Fe, 0.23 Mn, 0.19 Si, 0.12 Cu, 0.09 C, 0.007 S.	Hot rolled; annealed at 1600 F for 3 hrs, 1800 F for 15 min, and then air cooled.
□	58-1	116-1144		Inconel X; 72.94 Ni, 14.65 Cr, 6.97 Fe, 2.44 Ti, 1.01 Nb, 0.93 Al, 0.54 Mn, 0.46 Si, 0.03 C, 0.02 Cu, and 0.007 S.	Hot rolled; solution treated at 2100 F for 3 hrs and and air cooled, then double aged at 1550 F for 24 hrs and 1300 F for 20 hrs respectively and both followed by air cooling.



THERMAL DIFFUSIVITY -- NICKEL + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-2	323-973	±1	Okh 20N60B (USSR design.); 59.64 Ni, 20.4 Cr, 17.7 Fe, 1.59 Mn, 0.58 Nb, 0.25 Si, 0.06 C, and 0.004 S.	Quenched in water from 1050 C and then tempered at 720 C for 1 hr in air.
□	63-2	373-1073	±1	Okh 21N78T (EI-435, USSR design.); 77.23 Ni, 21.1 Cr, 0.56 Fe, 0.49 Mn, 0.32 Si, 0.23 Ti, 0.06C, 0.006 S, 0.005 P, and traces of Cu.	Quench in water from 1100 C.

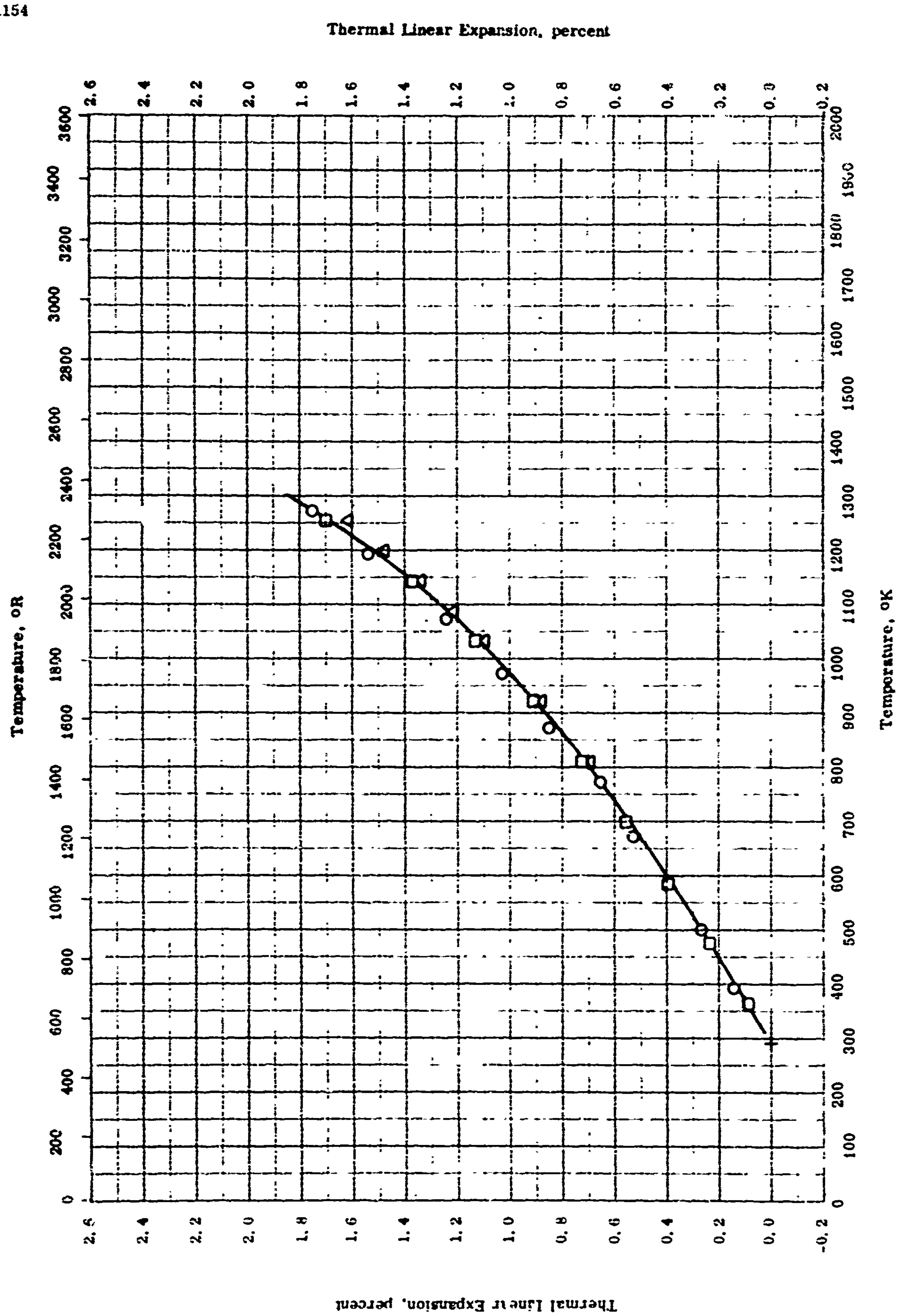


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(11 - 16 Cr and 3.5 - 6.5 Al)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(11 - 16 Cr and 3.5 - 6.5 Al)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-43	294-1096		Inco 702; nominal: 78 Ni, 16 Cr, 3.5 Al, 0.5 Ti, and 0.03 C; density 0.296 lb in.$^{-3}$	Estimated from existing data on Inconel X by author.
□	61-2	300-1562		Inco 713C; 71.53 Ni, 11.0 Cr, 6.5 Al, 5.0 Fe, 3.5 Mo, 1.0 Si, 1.0 Mn, 1.0 Nb + Ta, 0.25 Ti and 0.20 C; density 9.23 g cm^{-3}	
△	63-22	311-1311		Haynes Alloy No. 713C; nominal: bal Ni, 12.00 - 14.00 Cr, 5.50 - 6.50 Al, 3.80 - 5.20 Mo, 1.80 - 2.80 Nb + Ta, 2.50 Fe, 1.00 Co, 0.50 - 1.00 Ti, 0.50 Cu, 0.50 Si, 0.25 Mn, 0.08 - 0.20 C, 0.05 - 0.15 Zr, 0.015 S, and 0.005 - 0.015 B; density 7.91 g cm^{-3} and M.P. 1286 - 1342 C.	

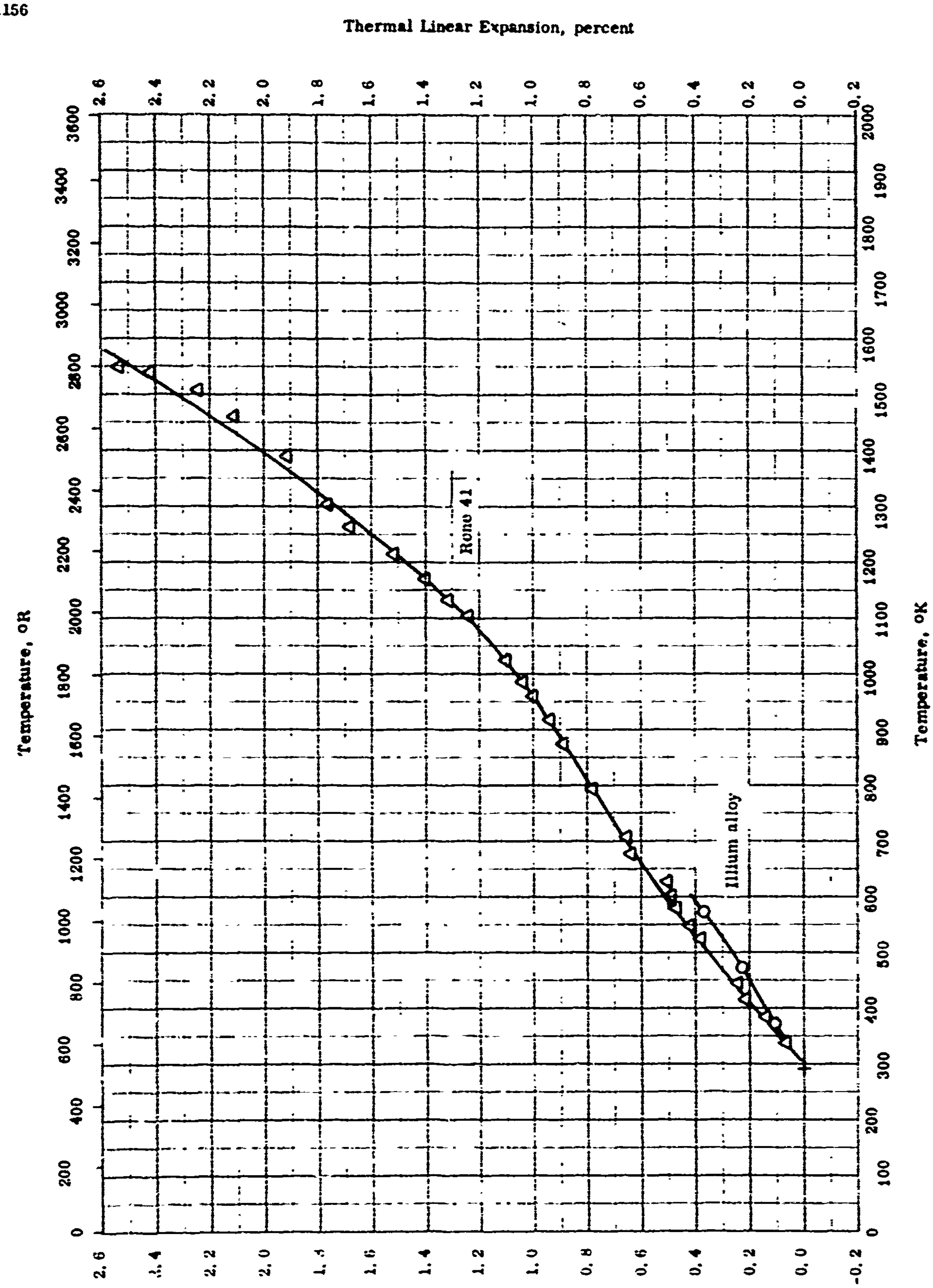


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(18 - 20 Cr and 10 - 20 Co)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(18 - 20 Cr and 10 - 20 Co)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-52	373-1273		Waspalloy; 55.45 Ni, 19.22 Cr, 11.20 Co, 7.00 Mo, 2.49 Ti, 1.03 Al, 0.73 Fe, 0.67 Mn, 0.47 Si, 0.45 C, 0.12 Cu, 0.015 P, and 0.008 S.	Annealed 3 hrs at 1000 C in pure dry hydrogen, furnace cooled at 150 C hr^{-1} rate from 1000 C to 600 C, then at 85 C hr^{-1} rate to 20 C; author also gives second heating and cooling data to 1212 R identical to that of first heating.
□	65-2	273-1255		Hastelloy 500: 18.00 - 20.00 Cr, 16.00 - 20.00 Co, 3.00 - 5.00 Mo, 2.75 - 3.25 Al, 2.75 - 3.25 Ti, 2.00 Fe, 0.30 Si, 0.20 Mn, 0.10 C, 0.10 Cu, 0.015 P, 0.015 S, and 0.003 - 0.010 B; density 0.290 lb $in.^{-3}$ and M. P. 2375 - 2450 F.	Expansion test made on wrought stock solution-treated 4 hrs at 1975 F, air cooled, aged 24 hrs at 1550 F, air cooled, aged 16 hrs at 1400 F, and air cooled again.
△	63-24	294-1255		Haynes alloy No. R-41; 18.00 - 20.00 Cr, 10.00 - 12.00 Co, 9.00 - 10.50 Mo, 5.00 Fe, 3.00 - 3.30 Ti, 1.40 - 1.80 Al, 0.50 Si, 0.50 Mn, 0.05 - 0.12 C, 0.015 S, and 0.003 - 0.010 B; density 8.25 g cm^{-3} and M. P. 1310 - 1345 C.	Average data of wrought and cast forms of alloy.

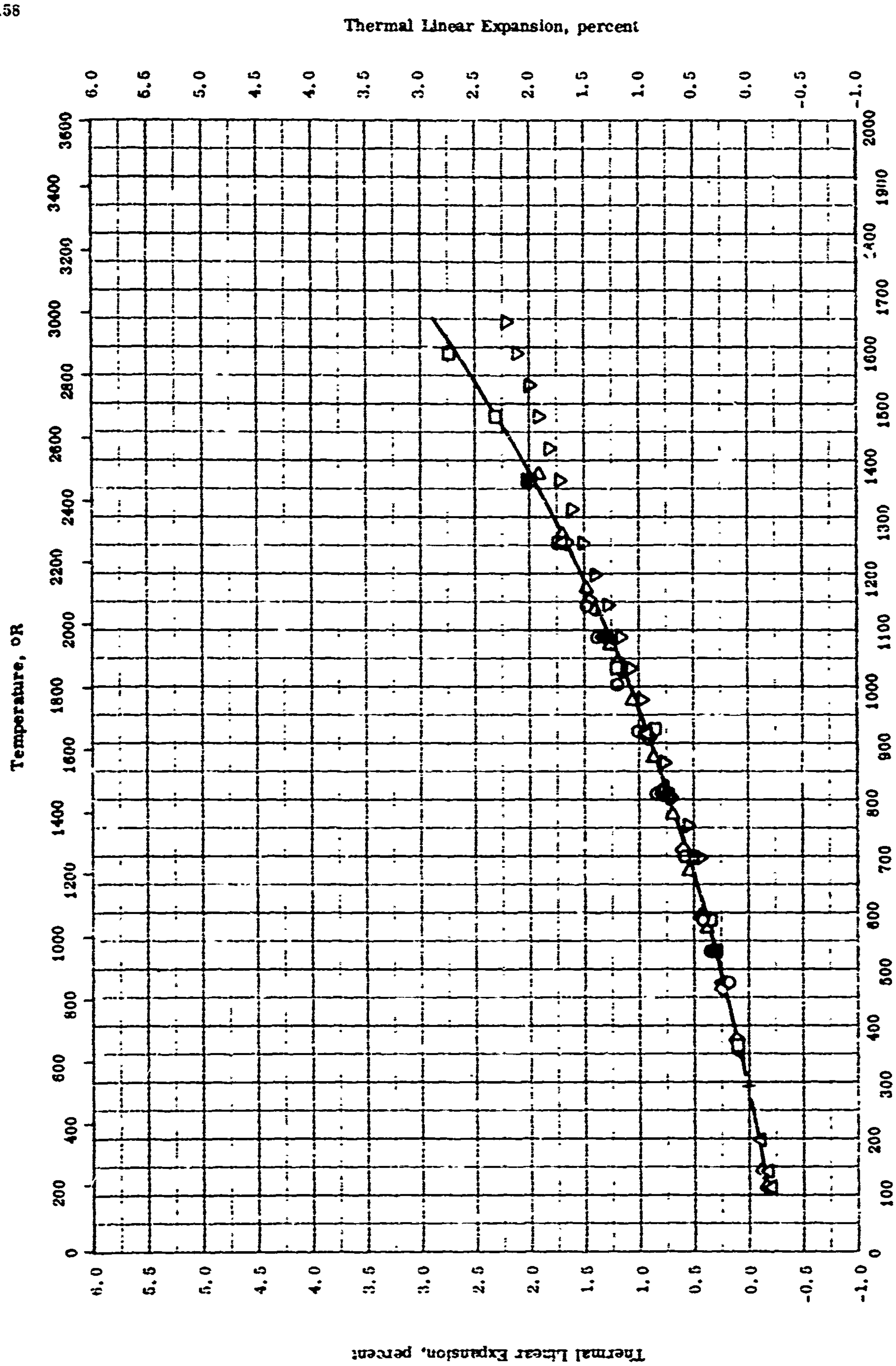


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(18 - 24 Cr and 7 - 11 Cu)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(18 - 24 Cr and 7 - 11 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-52	373-573		Illium alloy; 59.0 Ni, 24.0 Cr, 7.0 Cu, 4.0 Mo, 2.0 W, 1.5 Mn, Si each, and 1.0 Ag.	Cast.
△	61-2	294-1552		Rene 41 (GE-J 1610); 54.60 Ni, 18.60 Cr, 10.73 Cu, 9.63 Mo, 3.14 Ti, 1.54 Fe, 1.49 Al, 0.11 C, 0.08 Mn, and 0.07 Si; density 8.08 g cm^{-3}.	Solution-treated at 1975 F and water-quenched.



THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(14 - 17 Cr and 3 - 8 Fe)

REFERENCE INFORMATION

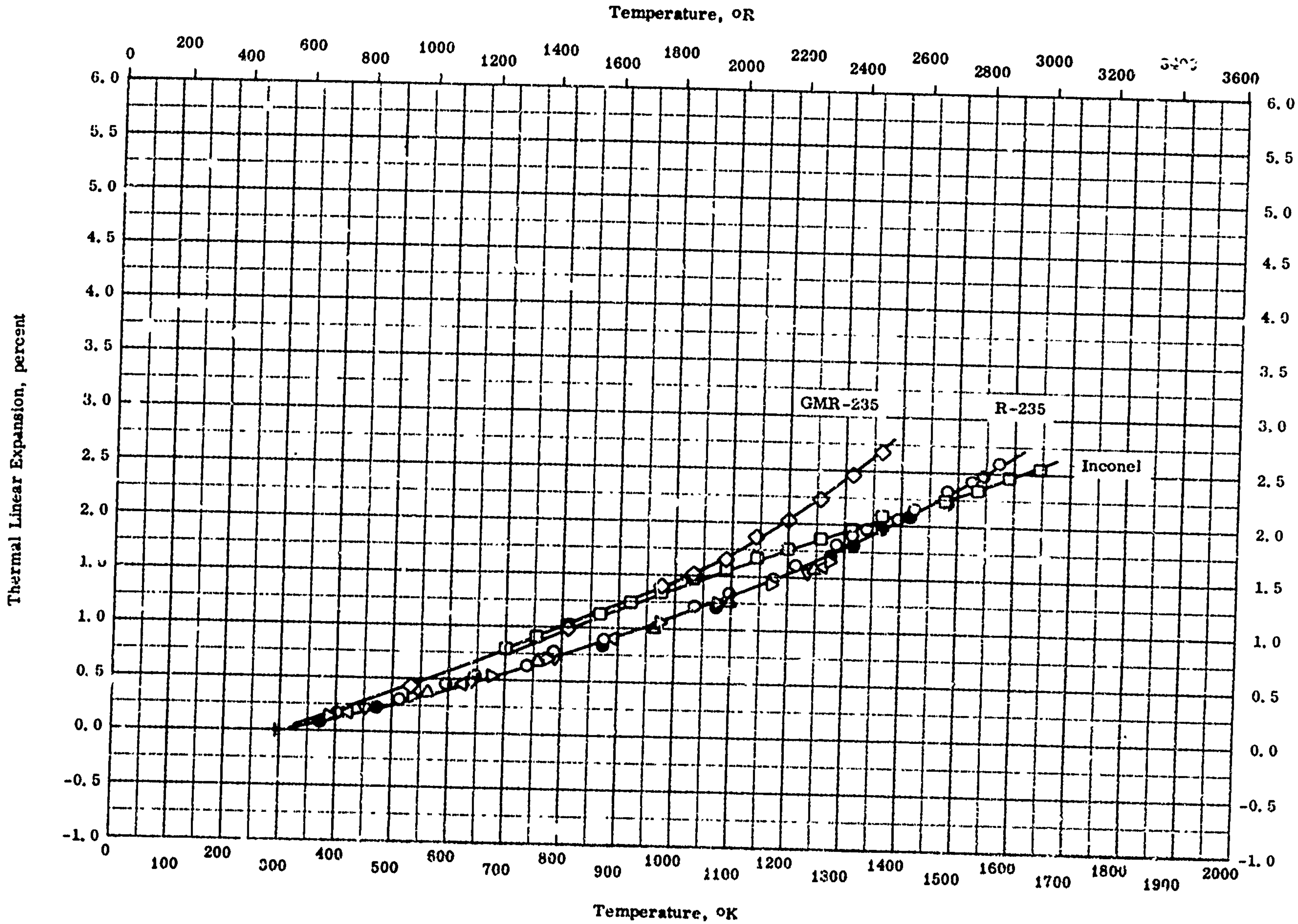
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-9	311-1145		Inconel X; Nominal: 70 min Ni, 14 - 16 Cr, 5 - 9 Fe, 2.25 - 2.75 Ti, 0.7 - 1.2 Nb, 0.4 - 1.0 Al, 0.3 - 1.0 Mn, 0.50 max Si, 0.20 Cu, 0.08 C, and 0.01 S.	
□	51-16	293-1589		Inconel X; 74.5 Ni, 14.5 Cr, 7.0 Fe, 2.5 Ti, 1.0 Nb, 0.48 Mn, 0.48 Si, and 0.05 C.	
△	51-6 also 58-1	117-1256		Inconel X; 72.94 Ni, 14.65 Cr, 6.07 Fe, 2.44 Ti, 1.01 Nb, 0.93 Al, 0.54 Mn, 0.46 Si, 0.03 C, and 0.02 Cu; density 515 lb ft^{-3}.	Hot rolled; solution treated 3 hrs at 2100 F, air cooled, aged 24 hrs at 1550 F, then 20 hrs at 1300 F; air cooled; tested in vacuum.
◇	51-6 also 58-1	117-1256		Inconel; 78.92 Ni, 14.62 Cr, 5.80 Fe, 0.23 Mn, 0.19 Si, 0.09 C, and 0.007 S; density 529 lb ft^{-3}.	Hot rolled; annealed 3 hrs at 1600 F, 15 min at 1800 F, air cooled.
▽	58-13	293-1644	<5	Inconel X; 73.63 Ni (by diff.), 14.04 Cr, 7.93 Fe, 2.73 Ti, 0.67 Mn, 0.57 Nb, 0.56 Al, and 0.41 Si; density 8.20 g cm^{-3}.	Tested in vacuum with a heating rate at 3 - 5 F min^{-1}.
▷	64-10	273-1273	1	EI-607 (Russian design.); bal Ni, 15 - 17 Cr, 3.0 Fe, 1.7 - 2.1 Ti, 1.0 - 1.5 Nb, 1.0 Mn, 1.0 Si, 0.5 - 1.0 Al, and 0.07 C.	
●	65-4	294-1089		Inconel 600; formerly "Inconel Alloy" from International Nickel Co.; nominal: 76.0 Ni, 15.8 Cr, 7.20 Fe, 0.20 Mn, 0.20 Si, 0.10 Cu, 0.04 C, and 0.007 S; density 0.304 lb $in.^{-3}$ and M.P. 2500 - 2600 F.	

(continued onto next page)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i (Continued)
(14 - 17 Cr and 3 - 8 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
■	65-4	294-1089		Inconel 604; formerly "Inconel 600" from International Nickel Co.; nominal: 74.0 Ni, 15.8 Cr, 7.20 Fe, 2.0 Nb, 0.20 Mn, 0.20 Si, 0.10 Cu, 0.04 C, and 0.007 S; density 0.305 lb in.$^{-3}$	
▲	65-4	294-1089		Inconel 72[illegible]; formerly "Inconel M" from International Nickel Co.; nominal: 71.0 Ni, 16.0 Cr, 7.20 Fe, 3.00 Ti, 2.25 Mn, 0.12 Si, 0.10 Cu, 0.04 C, and 0.007 S; density 0.298 lb in.$^{-3}$	
▼	65-4	294-1366		Inconel 722; formerly "Inconel W" from International Nickel Co.; nominal: 75.0 Ni, 15.0 Cr, 6.50 Fe, 2.40 Ti, 0.60 Al, 0.55 Mn, 0.20 Si, 0.05 Cu, 0.04 C, and 0.007 S; density 0.298 lb in.$^{-3}$ and M.P. 2540 - 2600 F.	
◆	65-4	294-1089		Inconel X - 750; formerly "Inconel X" from Internal Nickel Co.; nominal: 73.0 Ni, 15.0 Cr, 6.75 Fe, 2.50 Ti, 0.85 Nb, 0.80 Al, 0.70 Mn, 0.30 Si, 0.05 Cu, 0.04 C, and 0.007 S; density 0.298 lb in.$^{-3}$ and M.P. 2540 - 2600 F.	



THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(14 - 17 Cr and 8 - 12 Fe)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(14 - 17 Cr and 8 - 12 Fe)

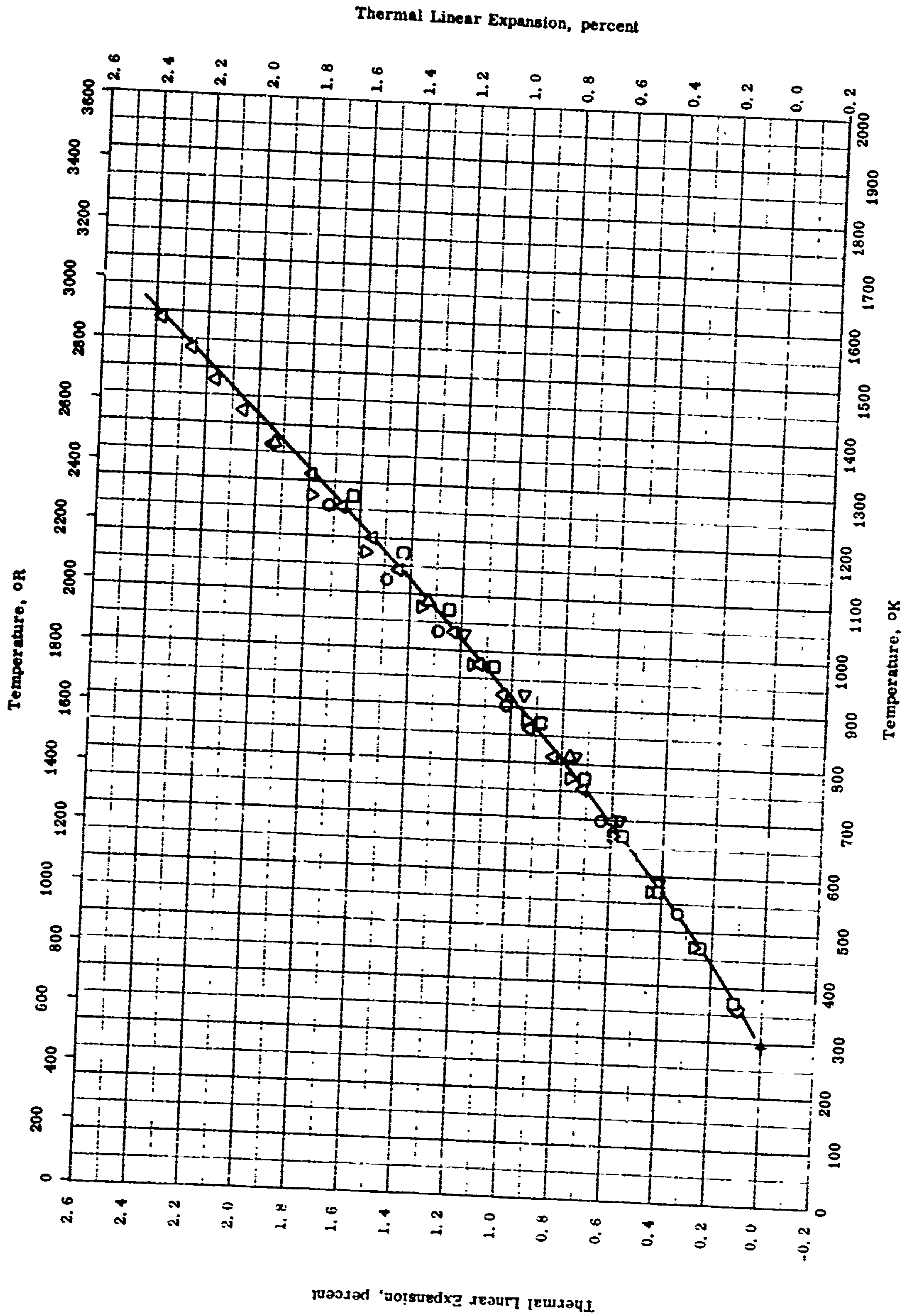
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
▷	57-52	293-1273		Inconel; three samples a) 75.99 Ni, 14.42 Cr, 8.87 Fe, 0.28 Mn, 0.22 Cu, 0.17 Si, 0.02 C, and 0.007 S. b) 75.64 Ni, 15.32 Cr, 8.17 Fe, 0.33 Mn, 0.21 Si, 0.19 Cu, 0.11 C and 0.007 S. c) 76.45 Ni, 14.96 Cr, 7.89 Fe, 2.6 Mn, 0.19 Si, 0.15 Cu, 0.07 C, and 0.007 S.	Hot rolled and machined, annealed by rapid insertion into preheated furnace at 2050 F for 9-1/4 min, and cooled in quiescent air; heating data; average of three samples plotted, max deviation of ±0.6%.
◁	57-52	293-1273		Sample (a) above.	Same heat treatment as above; cooling data.
△	57-52	293-1273		Sample (b) above.	Same as above.
▽	57-52	293-1273		Sample (c) above.	Same as above.
○	58-7	390-1571		Hastelloy R-235; nominal: 66 Ni, 14-17 Cr, 9-11 Fe, 4.5-6.5 Mo, 2.25-2.75 Ti, < 2.5 Co, 1.75-2.25 Al, < 1 Mn, Si each, and < 0.16 C.	Tested in helium.
□	58-13	293-1644	·5	Inconel; 75.54 Ni (by diff.), 15.15 Cr, 8.24 Fe, 0.35 Ti, 0.30 Mn, 0.23 Si, 0.094 Co, 0.077 C, and < 0.02 Mo; density 8.40 g cm^{-3}.	Tested in vacuum with a heating rate at 3-5 F min.$^{-1}$.
●	62-6	295-1480		Hastelloy R-235; 62.15-69.15 Ni, 14.00-17.00 Cr, 9.00-11.00 Fe, 4.50-6.50 Mo, 2.25-2.75 Ti, 2.50 Co, 1.75-2.25 Al, 0.60 Si, 0.25 Mn, 0.16 C, 0.010 P, and 0.030 S; density 8.22 g cm^{-3}, M.P. 1351-1389 C, and electric resistivity 133 microhm-cm at 22 C. (Continued onto next page)	

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i (continued)
(14 - 17 Cr and 8 - 12 Fe)

REFERENCE INFORMATION

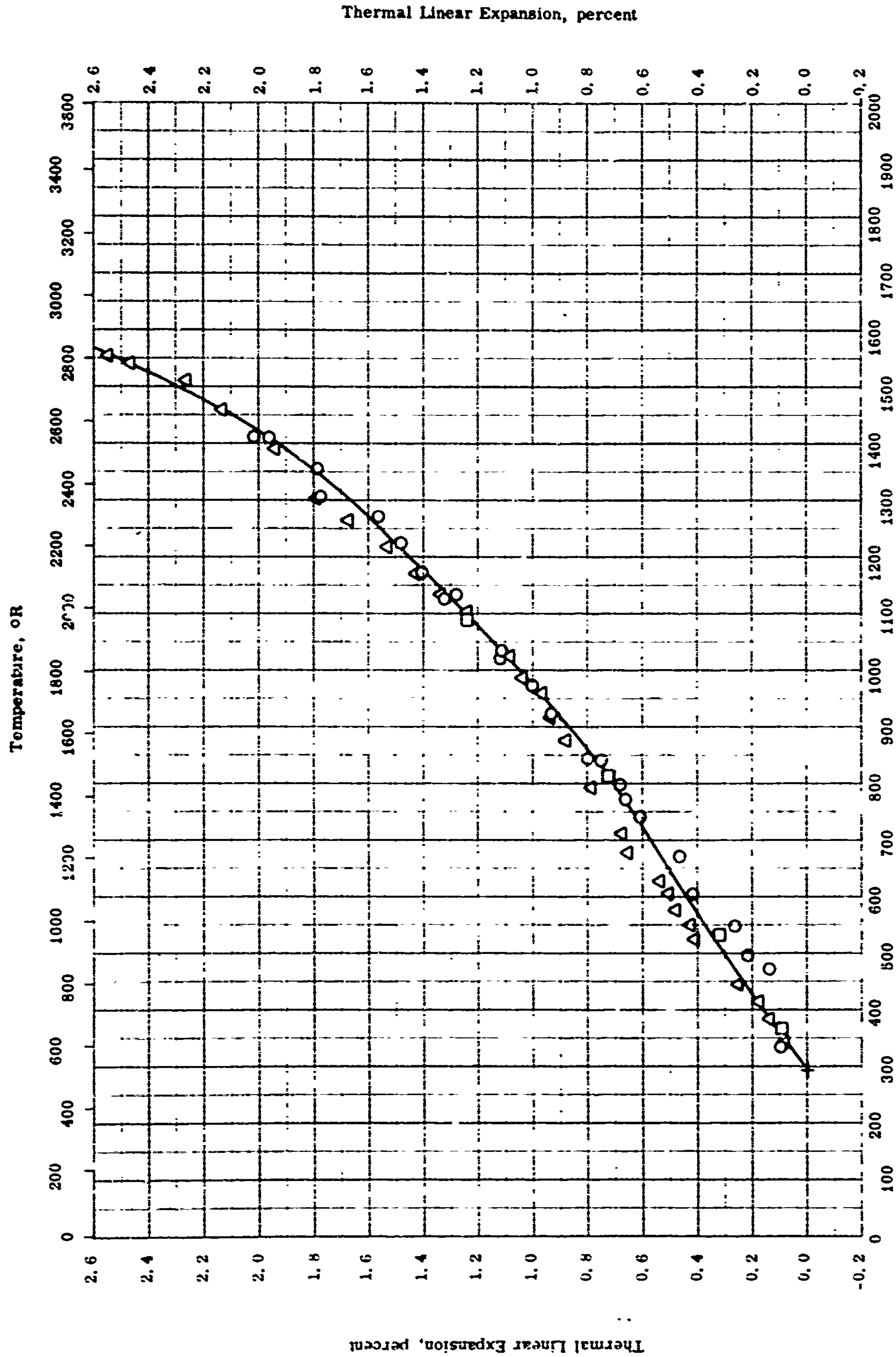
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◇	60-22	294-1366		Haynes GMR-235; 57.88 - 68.53 Ni, 14.00 - 17.00 Cr, 8.00 - 12.00 Fe, 4.50 - 6.00 Mo, 2.50 - 3.50 Al, 1.50 - 2.50 Ti, 0.60 Si, 0.25 Mn, 0.10 - 0.20 C, and 0.025 - 0.07 B; density 8.03 g cm^{-3} and electral resistivity 137.3 microhm-cm at 25C.	Air-melted; data determined by Allison Div., General Motors Corp.



THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(18 - 29 Cr and 12 - 25 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-25	533-1256		75 GE-62 Braze + 25 AISI 310; nominal: 56.88 Ni, 21.25 Cr, 12.80 Fe, 8.62 Si, < 0.06 C, and 0.50> Mn.	Arc-melted, cast, heat treated 24 hrs at 1800 F in vacuum; tested in vacuum; plotted data are average of two complete heating and cooling cycles.
△	58-13	293-1588	≤5	Hastelloy X, 51.15 Ni (by diff.), 19.79 Cr, 17.95 Fe, 7.43 Mo, 1.58 Co, 0.86 Si, 0.81 Mn, 0.19 Ti, 0.13 W, and 0.11 C; density 8.15 g cm^{-3}.	Tested in vacuum with a heating rate at 3 - 5 F min.$^{-1}$.
□	61-26	299-1273		Hastelloy X; 20.50 - 23.00 Cr, 17.00 - 20.00 Fe, 8.00 - 10.00 Mo, 0.50 - 2.50 Co, 0.20 - 1.00 W, 0.050 - 0.15 C, and 1.00 max Si, Mn each; density 8.23 g cm^{-3} and M. P. 1288 C.	
▽	62-27	293-1273		Hastelloy F; 44.00 - 47.00 Ni, 21.00 - 23.00 Cr, 16.48 Fe (by diff.), 5.5 - 7.5 Mo, 2.50 Co, 1.75 - 2.50 (Nb + Ta), 1.00 - 2.00 Mn, 1.00 Si, 1.00 W, 0.05 - 0.12 C, 0.50 Ta, 0.04 P, and 0.03 S; density 8.17 g cm^{-3} and M. P. ~1288 C.	Average data of wrought and cast forms of alloy.
▷	65-4	294-1366		Inconel 718; International Nickel Co.; nominal: 52.5 Ni, 18.6 Cr, 18.5 Fe, 5.0 Nb, 3.1 Mo, 0.90 Ti, 0.40 Al, 0.30 Si, 0.20 Mn, 0.07 Cu, 0.04 C, and 0.007 S; density 0.296 lb in.$^{-3}$	
◇	65-4	294-366		Incoloy 804; International Nickel Co.; nominal: 42.6 Ni, 29.3 Cr, 25.4 Fe, 0.85 Mn, 0.50 Si, 0.40 Cu, 0.40 Ti, 0.25 Al, 0.06 C, and 0.007 S; density 0.286 lb in.$^{-3}$	
◁	65-5	295-1033		Haynes Alloy No. 718.	Vacuum-melted and precipitation hardened alloy.

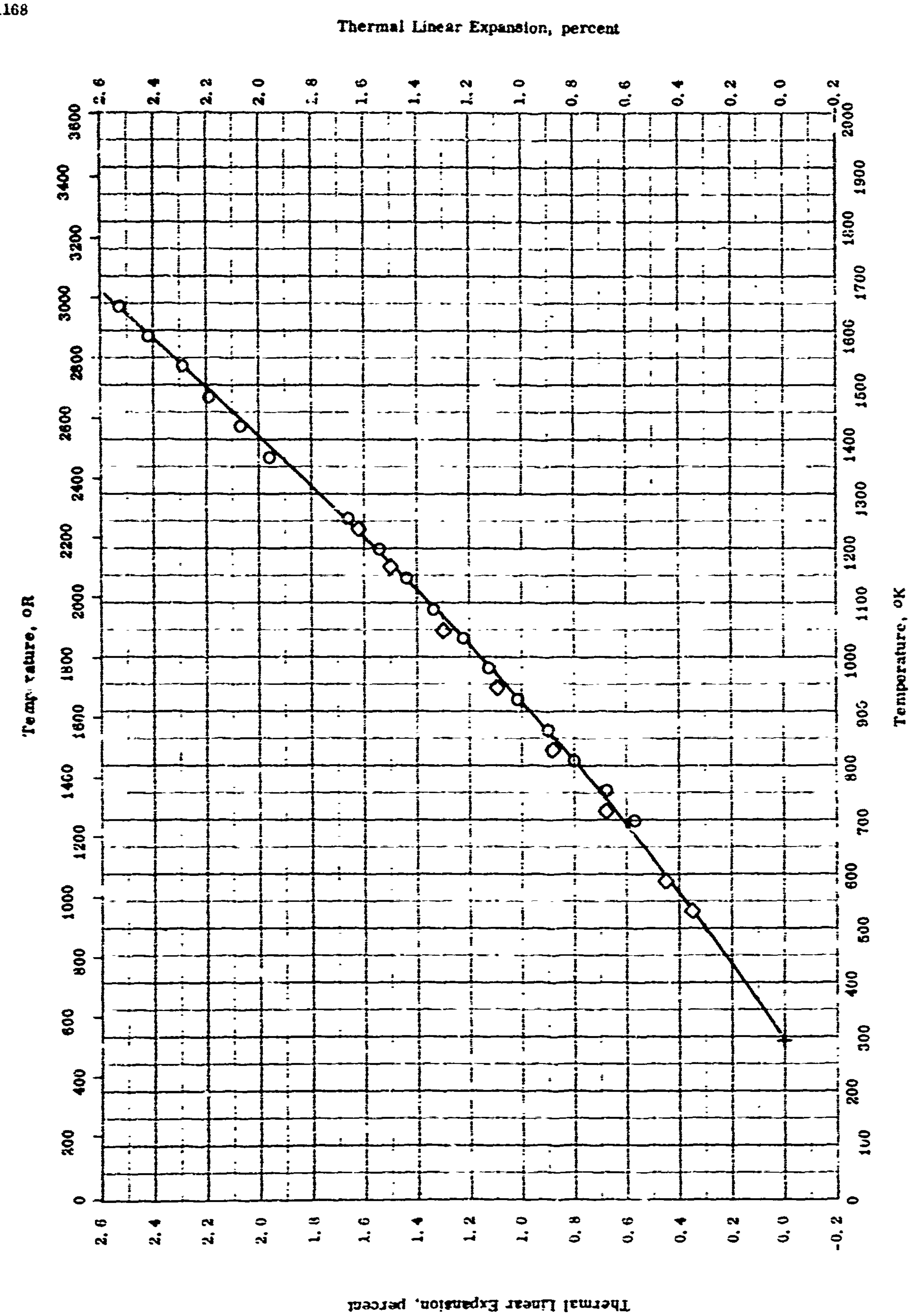


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣXi
(15 - 22 Cr and 9 - 15 Mo)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(15 - 22 Cr and 9 - 15 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-2	300-1406		Hastelloy C; before test: 56.07 Ni, 15.83 Cr, 14.57 Mo, 4.94 Fe, 4.41 W, 0.070 C; after test: 56.00 Ni, 15.82 Cr, 14.53 Mo, 5.04 Fe, 4.49 W, and 0.068 C; density 556.9 lb ft^{-3}.	
△	61-2	294-1552		M-252 (GE J 1500): 57.15 Ni, 18.65 Cr, 9.98 Mo, 9.75 Cu, 2.74 Ti, 1.17 Al, < 0.30 Fe, 0.12 C, 0.07 Mn, and 0.06 Si; density 8.22 g cm^{-3}.	Solution -treated at 1950 F and air cooled.
□	65-4	294-1089		Inconel alloy 625; International Nickel Co.; nominal: 61.0 Ni, 22.0 Cr, 9.0 Mo, 4.0 Nb, 3.00 Fe, 0.30 Si, 0.15 Mn, 0.10 Cu, 0.05 C, and 0.007 S; density 0.305 lb in.$^{-3}$	

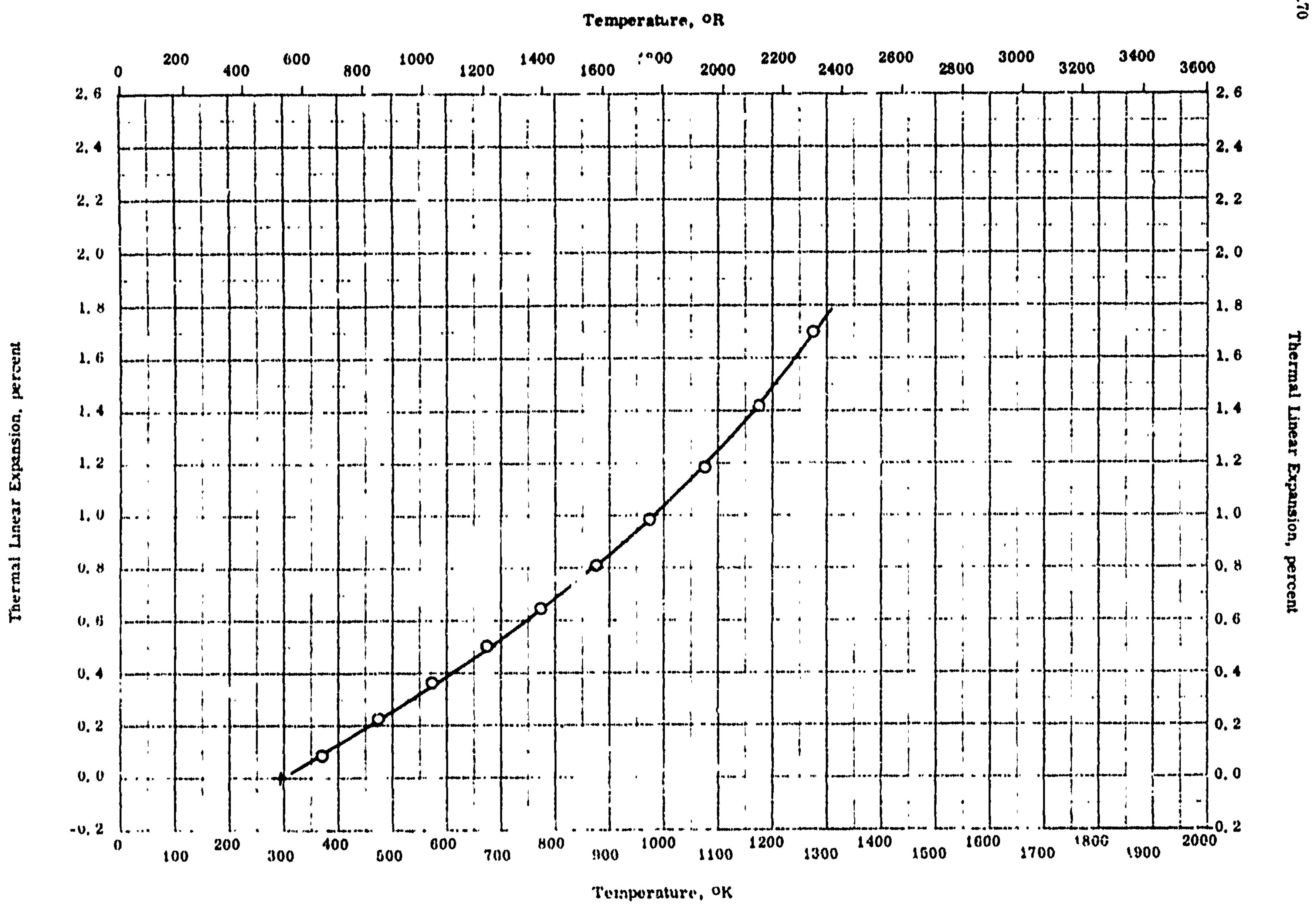


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(19 - 20 Cr and 0.6 - 11 Si)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(19 - 20 Cr and 0.6 - 11 Si)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-13	700-1644	≤5	79.52 Ni (by diff.), 19.33 Cr, 0.64 Si, 0.31 C, 0.17 Fe, 0.03 Mn, trace of P, and nil Ti; density 8.35 g cm^{-3}.	Tested in vacuum with a heating rate at about 3 - 5 F min^{-1}.
◇	53-25	533-1256		GE-62 Brazing alloy (similar to J-8100); nominal: 69 Ni, 20 Cr, and 11 Si.	Arc-melted, cast, heat treated 24 hrs at 1800 F in vacuum; data are average of 2 complete heating and cooling cycles, also gives data for samples in as-cast condition; tested in vacuum.

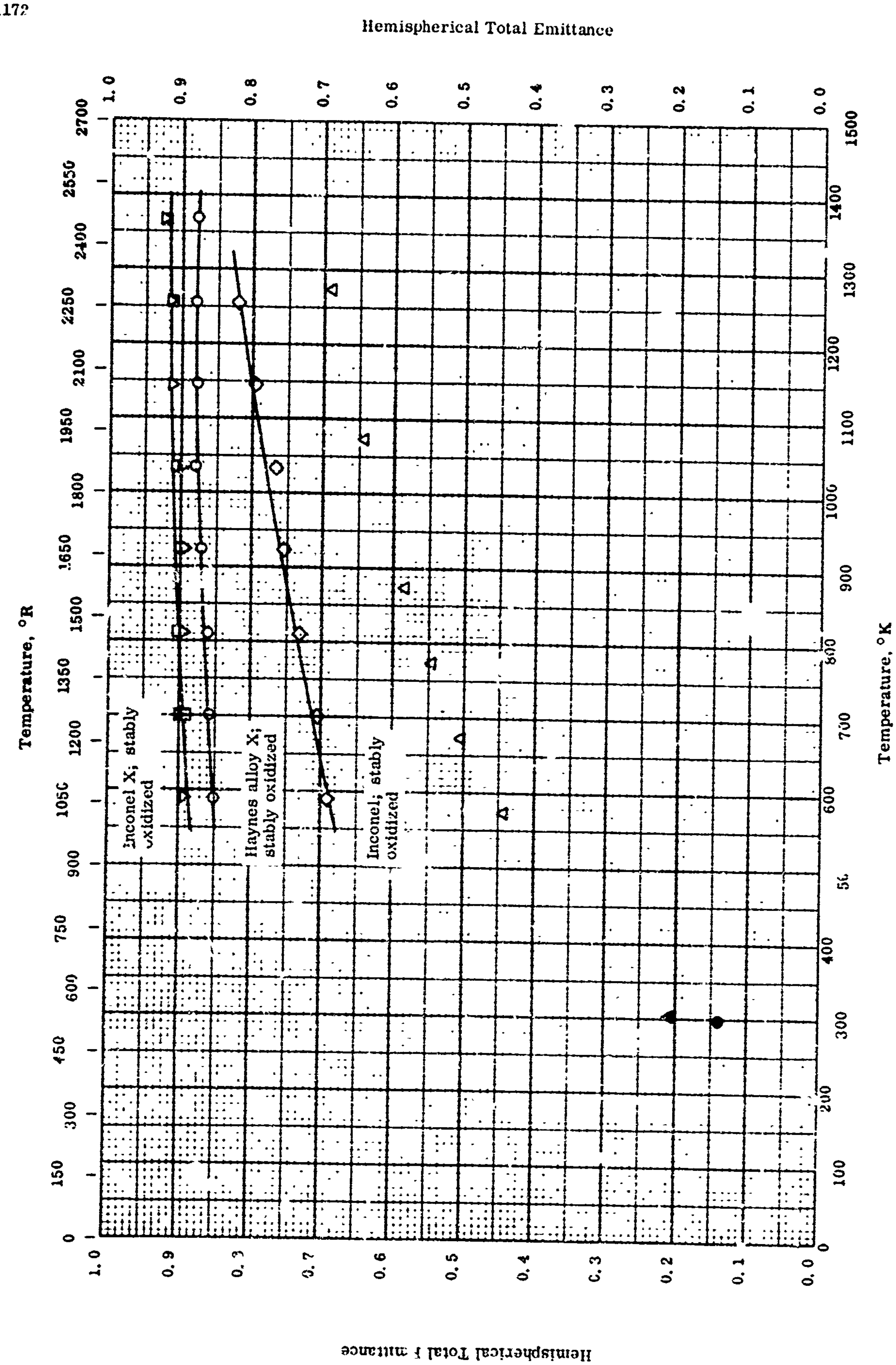


THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(13 - 16 Cr and 5 - 7 W)

THERMAL LINEAR EXPANSION -- NICKEL + CHROMIUM + ΣX_i
(13 - 16 Cr and 5 - 7 W)

REFERENCE INFORMATION

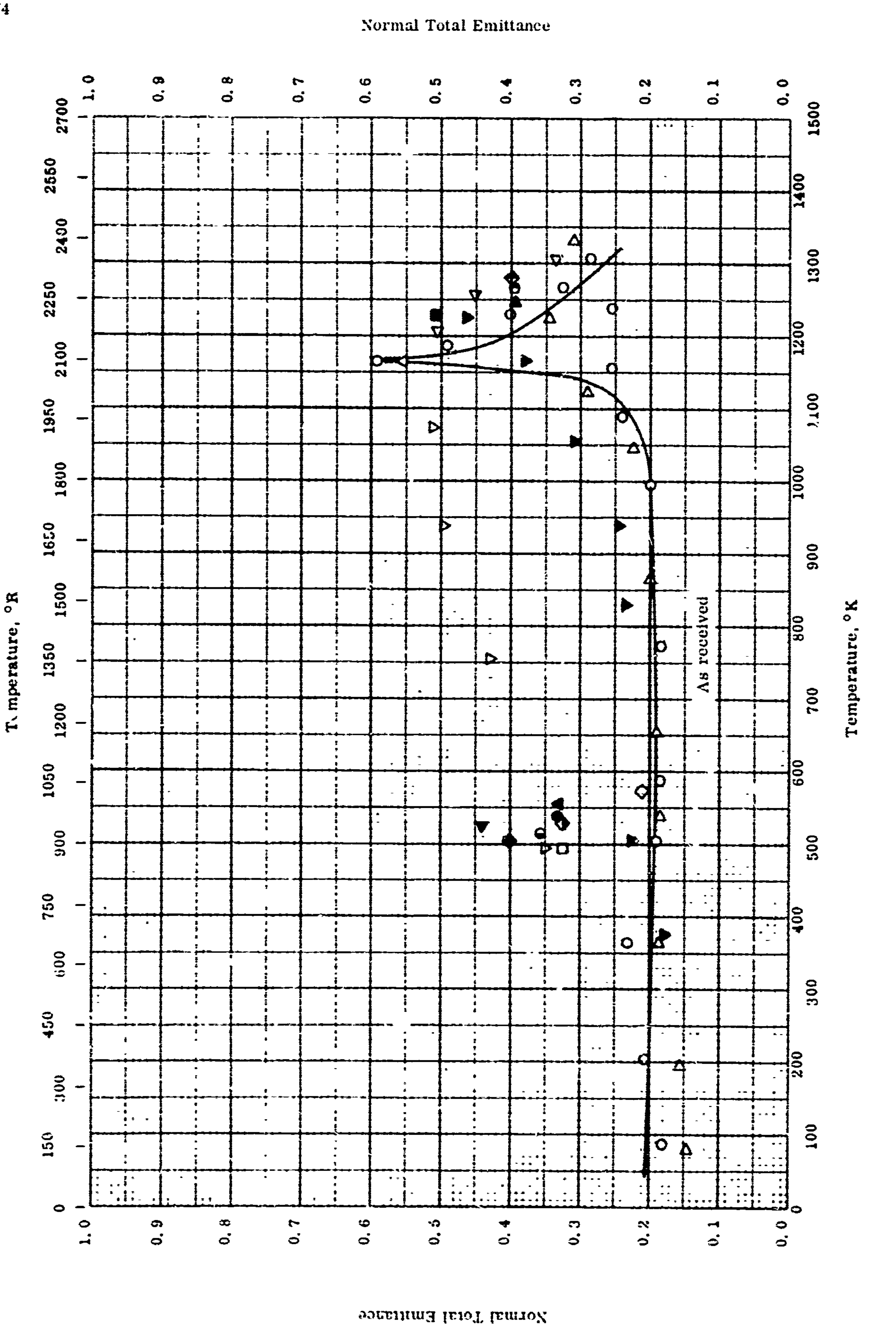
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	64-10	273-1273	1	EI-617 (Russian Design.): bal Ni, 13 - 16 Cr, 5.0 - 7.0 W, 5.0 Fe, 3.0 Mo, 2.0 Al, 2.0 Ti, 0.5 Mn, 0.5 Si, 0.5 V, and 0.08 C.	Author estimated 0.02% difference in expansion coefficient for reference temperature at 0 C and 20 C.



HEMISPHERICAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-17	589-1366		Haynes alloy X; nominal 42 - 52 Ni, 20.5 - 23 Cr, 17 - 20 e, 8 - 10 Mo, 1 max. Mn, 1 max. Si, 0.5 - 2.5 Co, 0.2 - 1.0 W, 0.05 - 0.15 C.	Cleaned, polished, washed and stably oxidized in air at 1366 K for 30 min.
△	55-35	573-1273		Inconel, nominal: 76 Ni, 16 Cr and 8 Fe.	
▽	57-50	589-1366	<5	Inconel X, nominal: 70 min. Ni, 14 - 16 Cr, 5 - 9 Fe, 2.25 - 2.75 Ti, 0.7 - 1.2 Nb, 0.4 - 1.0 Al, 0.3 - 1.0 Mn, 0.5 max. Si, 0.2 max. Cu, 0.08 max. C, and 0.01 max. S.	Immersed in an etching solution, polished, and oxidized at 1366 K for 30 min.
□	57-50	700-1366	<5	Inconel X.	Immersed in an etching solution, polished, oxidized from 0 to 1366 K over a period of 195 min.
◇	57-50	589-1255	<5	Inconel; 77 Ni, 15 Cr, 7 Fe, 0.25 Mn, 0.2 Cu, 0.25 Si, 0.08 C, and 0.007 S.	Immersed in an etching solution, polished and stably oxidized in air at 1366 K for 9 min.
●	48-7	299		Inconel.	Clean and smooth surface; measured in air.
▲	48-7	303		Inconel.	Dull finish; measured in air.



NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel B)

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel B)

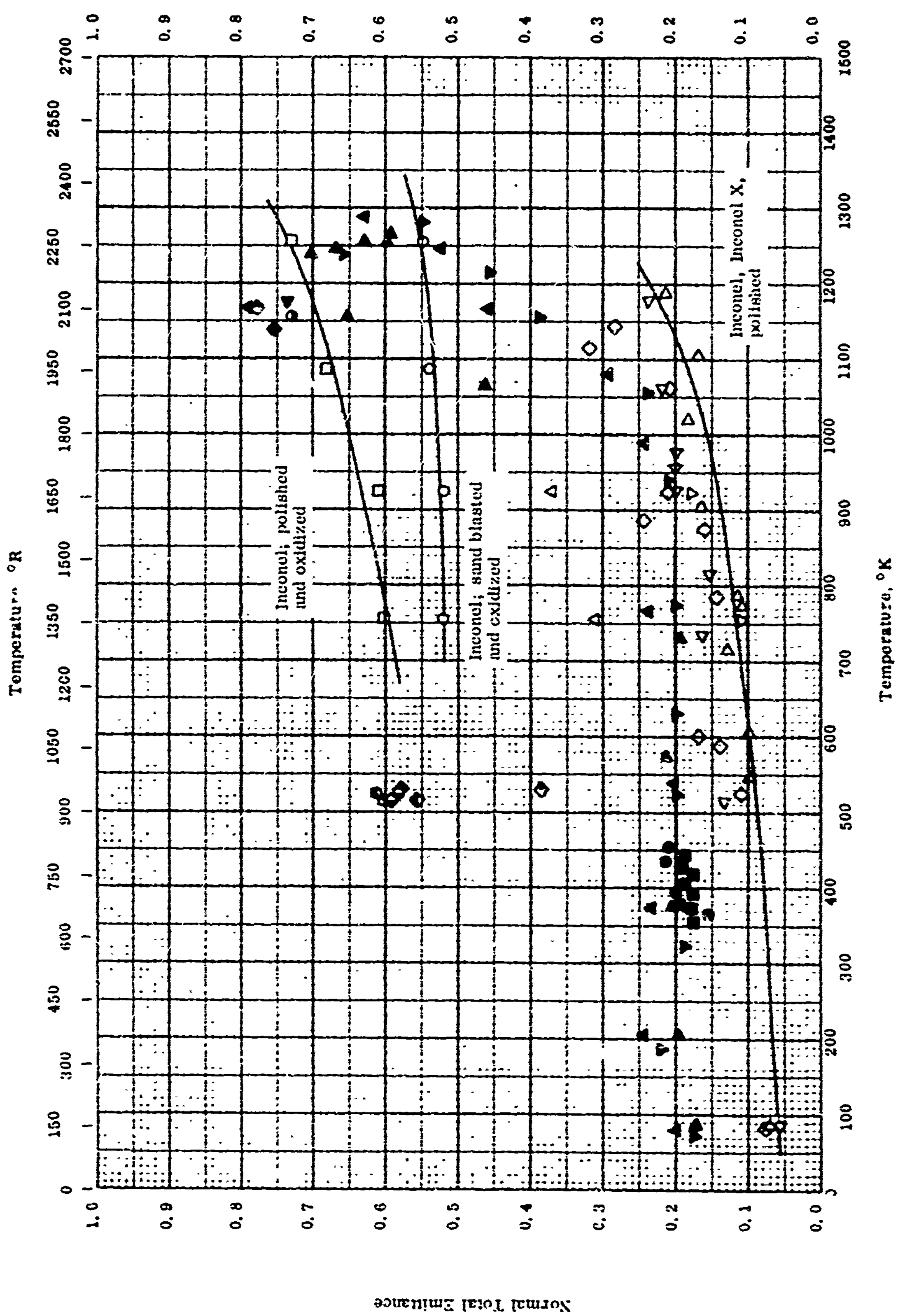
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-27	89-1164		Inconel B, nominal: 18 Cr, 9.5 Fe, 1 Mn, 0.15 C.	As received, wiped; measured in helium (10 microns pressure); cycle 1 heating.
□	54-27	497		Same as above.	The above specimen, cycle 1 cooling.
△	54-27	1164		Same as above.	The above specimen, cycle 2 heating.
▽	54-27	497-1072		Same as above.	The above specimen, cycle 2 cooling.
▷	54-27	80-1330		Inconel B.	Scrubbed, washed, and wiped; measured in helium (10 microns pressure); cycle 1 heating.
◇	54-27	572		Same as above.	The above specimen, cycle 1 cooling.
◁	54-27	1265-1305		Same as above.	The above specimen, cycle 2 heating.
●	54-27	539		Same as above.	The above specimen, cycle 2 cooling.
■	54-27	1230		Same as above.	The above specimen, cycle 3 heating.
▲	54-27	535		Same as above.	The above specimen, cycle 3 cooling.
▼	54-27	89-1222		Inconel B.	Polished to a mirror like finish, washed; measured in helium (10 microns pressure); cycle 1 heating.
◆	54-27	505		Same as above.	The above specimen, cycle 1 cooling.
▶	54-27	1247		Same as above.	The above specimen, cycle 2 heating.
◀	54-27	522		Same as above.	The above specimen; cycle 2 cooling.
◐	54-27	1280		Same as above.	The above specimen; cycle 3 heating.
				(continued onto next page)	

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i (Continued)
(Inconel B)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °F	Rept. Error %	Sample Specifications	Remarks
◆	54-27	530		Same as above.	The above specimen; cycle 3 cooling.
◑	54-27	1264		Same as above.	The above specimen; cycle 4 heating.
◐	54-27	514		Same as above.	The above specimen; cycle 4 cooling.



NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel and Inconel X)

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel and Inconel X)

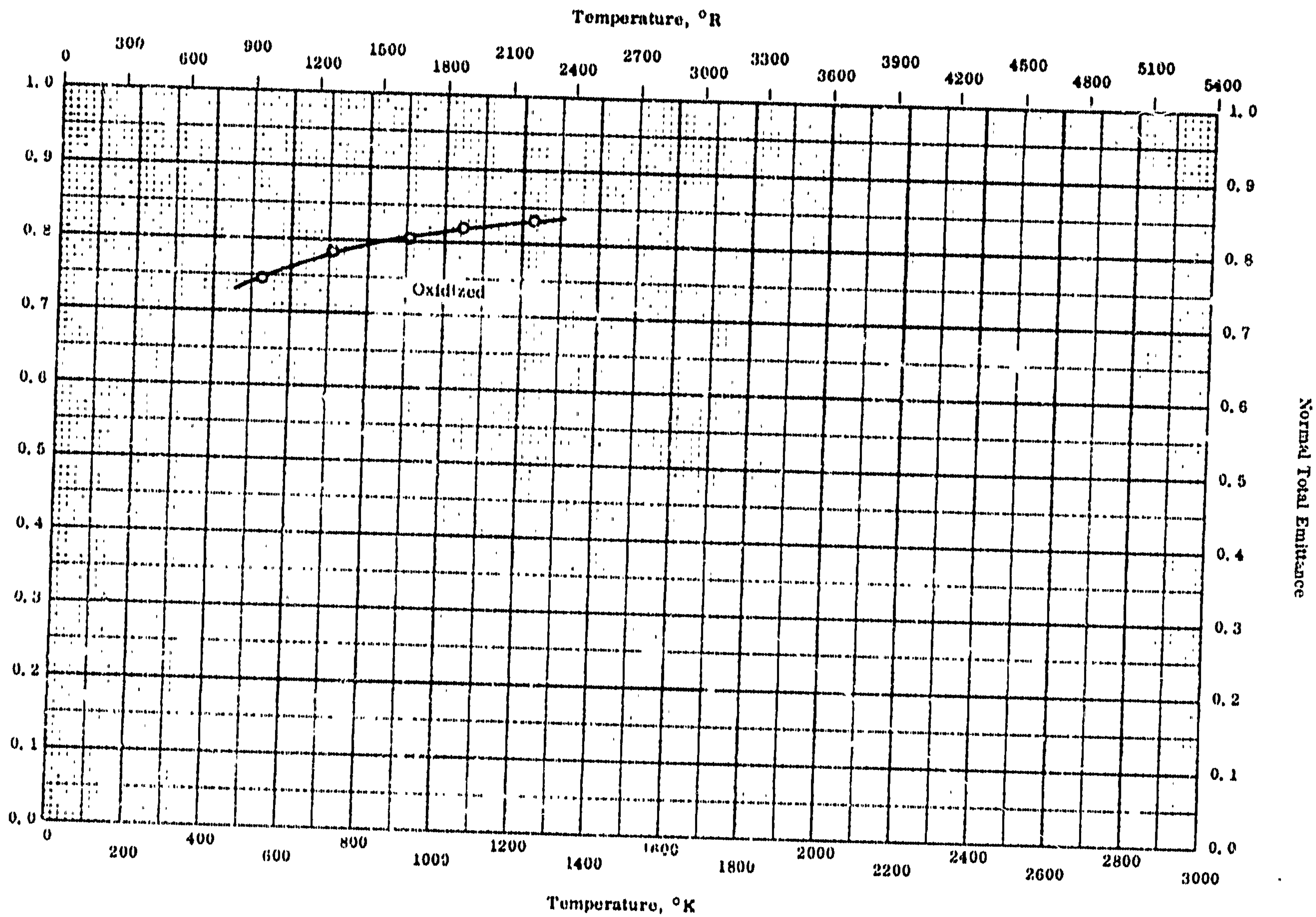
REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-16	755-1255	8	Inconel; nominal: 80 Ni, 14 Cr, and 4 Fe.	Sandblasted and oxidized in air at 1255 K for 30 min.
□	59-16	755-1255	8	Inconel.	Electropolished and oxidized in air at 811 K for 30 min.
△	59-16	755-922	8	Inconel.	Sandblasted.
▽	59-16	755-922	8	Inconel.	Electropolished.
◁	57-48	89-1178	± 10	Inconel X; nominal: 73 Ni, 15 Cr, 7 Fe, 2.5 Ti, 1 Cb, and 0.9 Al.	Measured in a vacuum (5×10^{-4} mm Hg); same emittance for as received and cleaned (with a liquid detergent).
▷	57-48	89 1189	± 10	Inconel X.	Polished with fine polishing compounds; measured in a vacuum (5×10^{-4} mm Hg).
◇	57-48	83-1144	± 10	Inconel X.	Oxidized in air at red heat for 30 min.; measured in a vacuum (5×10^{-4} mm Hg).
●	44-1	366-455	± 10	Inconel.	Untreated surface.
■	44-1	354-443	± 10	Inconel.	Oxidized at 1033 K to a brassy color.
▲	54-27	80-1164		Inconel X.	As received and wiped; measured in helium (10 microns pressure); cycle 1 heating.
◆	54-27	514		Inconel X.	The above specimen; cycle 1 cooling.
◆	54-27	1164		Inconel X.	The above specimen; cycle 2 heating.
				(continued onto next page)	

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i (Continued)
(Inconel and Inconel X)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
⬘	54-27	514		Inconel X.	The above specimen; cycle 2 cooling.
▼	54-27	72-1239		Inconel X.	Scrubbed, washed, and wiped; measured in helium (10 microns pressure); cycle 1 heating.
⬘	54-27	530		Inconel X.	The above specimen; cycle 1 cooling.
◆	54-27	1139		Inconel X.	The above specimen; cycle 2 heating.
◑	54-27	514		Inconel X.	The above specimen; cycle 2 cooling.
▶	54-27	89-1255		Inconel X.	Polished to a mirror like finish and washed; measured in helium (10 microns pressure); cycle 1 heating.
⬗	54-27	530		Inconel X.	The above specimen; cycle 1 cooling.
◀	54-27	1172		Inconel X.	The above specimen; cycle 2 heating.
◐	54-27	522		Inconel X.	The above specimen; cycle 2 cooling.
◒	54-27	1155		Inconel X.	The above specimen; cycle 3 heating.
◓	54-27	522		Inconel X.	The above specimen; cycle 3 cooling.

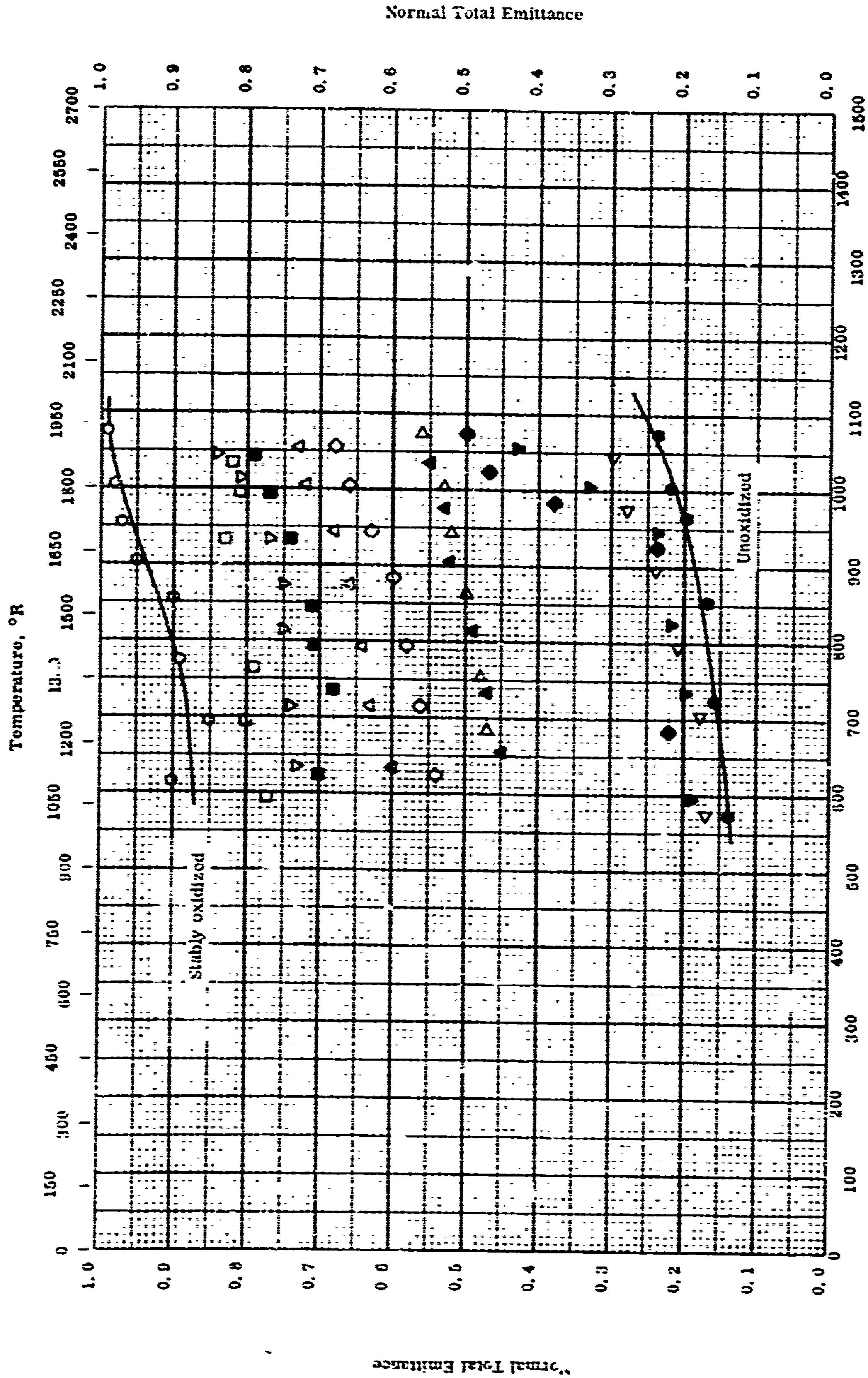


NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	60-20	527-1230		M 252; nominal: 54.00 Ni, 19.00 Cr, 10.00 Co, 10.00 Mo, 0.10 C, 1.00 Mn, 0.70 Si, 2.50 Ti, 0.75 Al, 0.10 C, 1.00 Mn, 0.005 B, and 2.00 F; surface roughness: fine structure 2.5 μ amplitude (as received), 2.5 μ amplitude (fully aged).	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air; measured in decreasing temperatures.

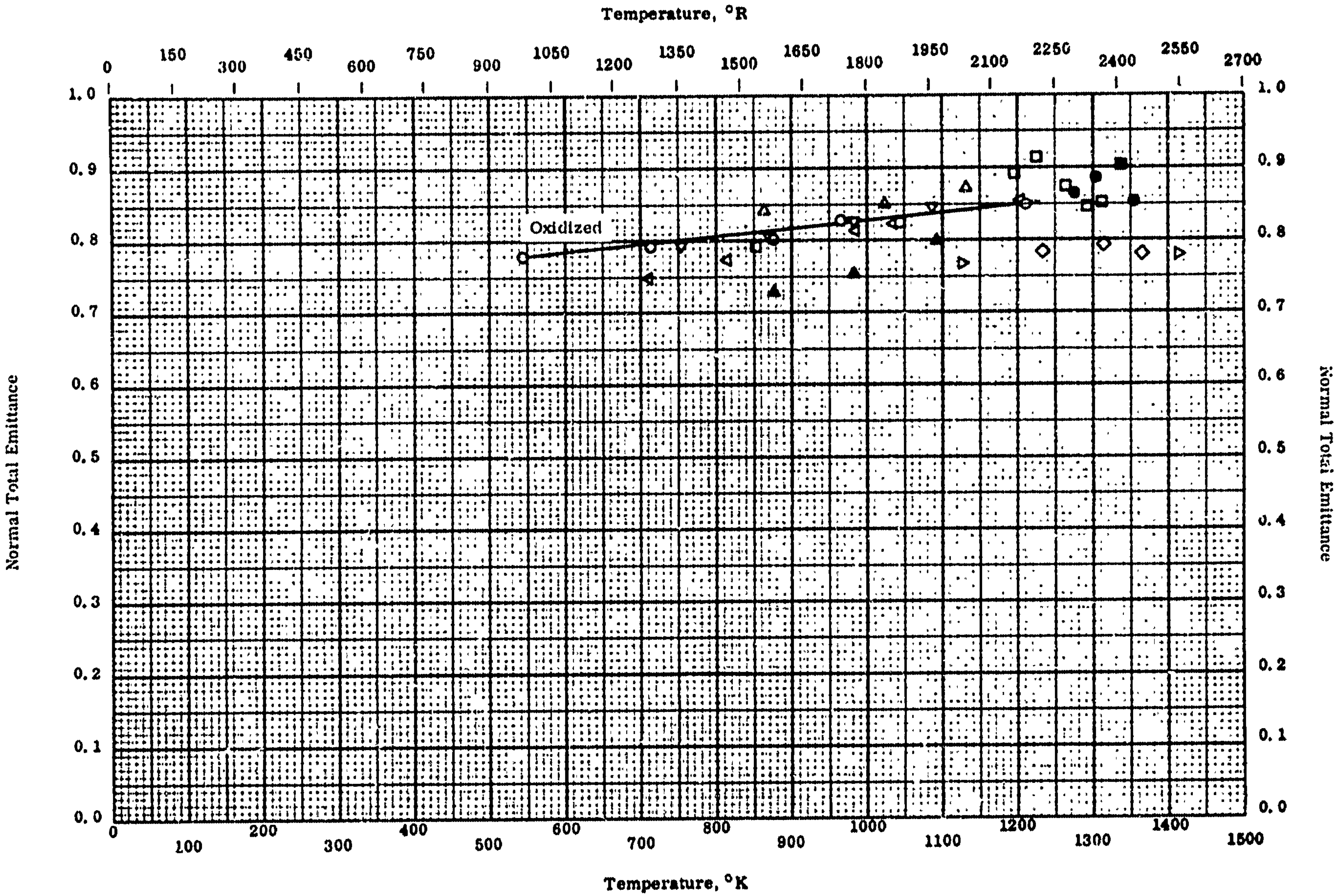


NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Nimonic 70)

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Nimonic 75)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-18	613-1073		Nimonic 75, nominal: 20 Cr, 5 Fe, 1 Si, 1 Mn, 0.4 Ti, and 0.12 C.	Blasted, cleaned and oxidized at 1473 K until a steady state is reached; measured in air.
□	52-18	593-1033		Same as above.	Same as above except oxidized at 1173 K until a steady state is reached.
△	52-18	633-1053		Same as above.	Same as above except oxidized at 873 K until a steady state is reached.
◇	52-18	623-1053		Same as above.	Same as above; unoxidized.
▽	52-18	633-1043		Nimonic 75.	Buffed, cleaned, and oxidized at 1473 K until a steady state is reached; measured in air.
▷	52-18	683-1073		Same as above.	Same as above except oxidized at 1173 K until a steady state is reached.
◁	52-18	573-1043		Same as above.	Same as above except oxidized at 873 K until a steady state is reached.
●	52-18	573-1073		Same as above.	Unoxidized.
■	52-18	623-1043		Nimonic 75.	As rolled, cleaned, oxidized at 1473 K until a steady state is reached; measured in air.
▲	52-18	653-1033		Same as above.	Oxidized at 1173 K until a steady state is reached.
▼	52-18	593-1053		Same as above.	Oxidized at 873 K until a steady state is reached.
◆	52-18	683-1073		Same as above.	Unoxidized.

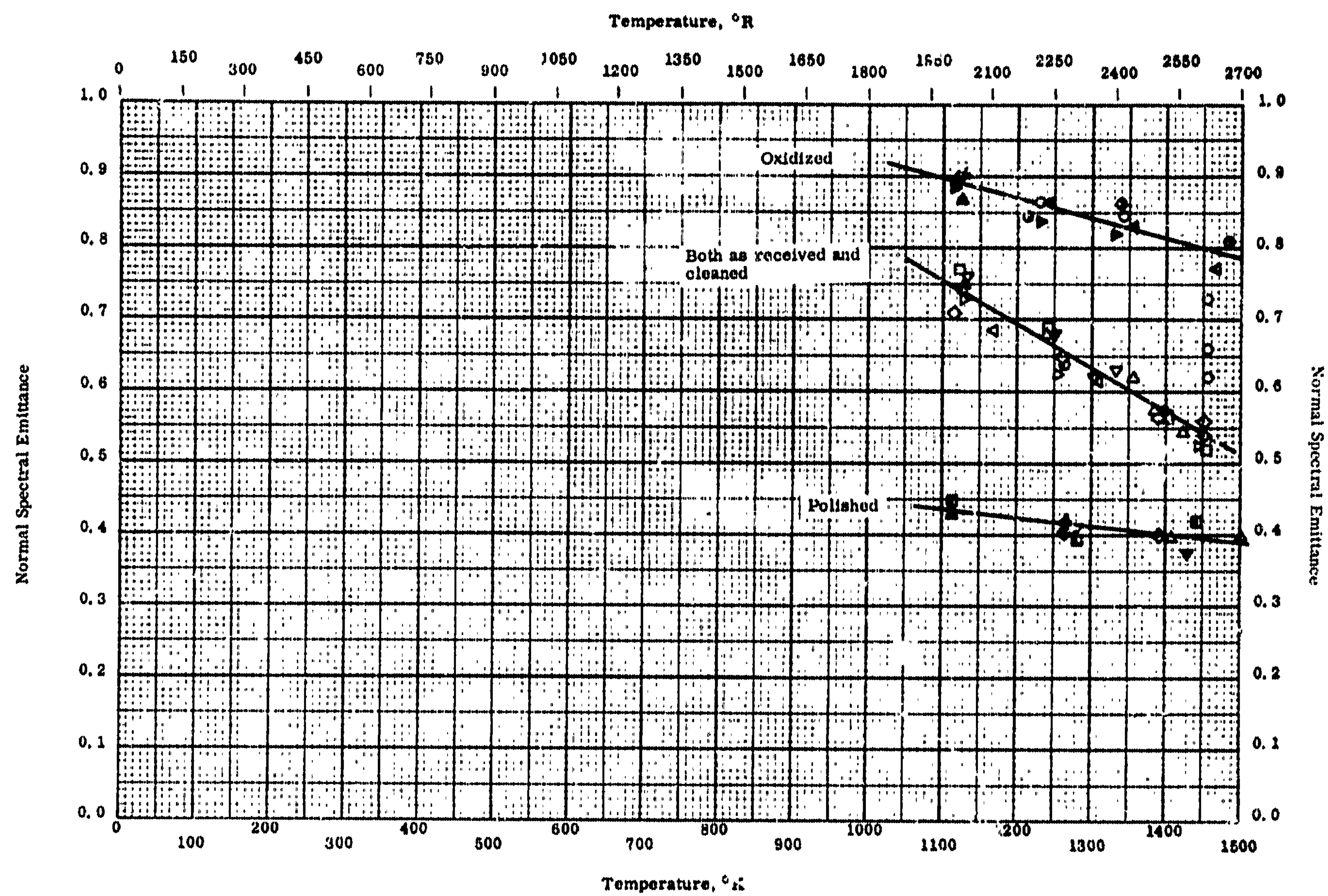


NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(René 41)

NORMAL TOTAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Rene' 41)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-20	544-1211		Rene' 41; nominal: 19.00 Cr, 11.00 Co, 10.00 Mo, 3.10 Ti, 1.50 Al, 0.09 C, and 0.005 B; surface roughness: (fully aged) fine structure 2 microns high, coarse structure 5 microns high at 200 microns intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air; measured in decreasing temperatures.
□	60-20	855-1311		Same as the above specimen.	Same as the above specimen received from Boeing; measured in increasing temperatures; the specimen heated by gas for temperatures higher than 1227.6 K.
△	60-20	864-1131		Same as above.	The above specimen measured in descreasing temperatures.
◇	62-22	1233-1366		Rene 41 from Boeing Aircraft Co. [Author's design.: Sample No. 1].	Chromel-Alumel thermocouple mounted off center on the face; using gas fired stand.
▽	62-22	755-1089		Same as above.	The above specimen using electrically heated stand.
▷	62-22	1128-1416		Same as above.	The above specimen using gas fired stand.
◁	62-22	711-1205		Same as above.	The above specimen using electrically heated stand.
●	62-22	1278-1355		Same as above.	The above specimen using gas fired stand.
■	62-22	1339		Same as above.	The above specimen using gas heated stand, based on optical pyrometer.
▲	62-22	755-1094		Rene' 41 from Boeing Aircraft Co. [Author's design.: Sample No. 2].	Chromel-Alumel thermocouple mounted on the center of the surface; using electrically heated stand.



NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel X)

REFERENCE INFORMATION

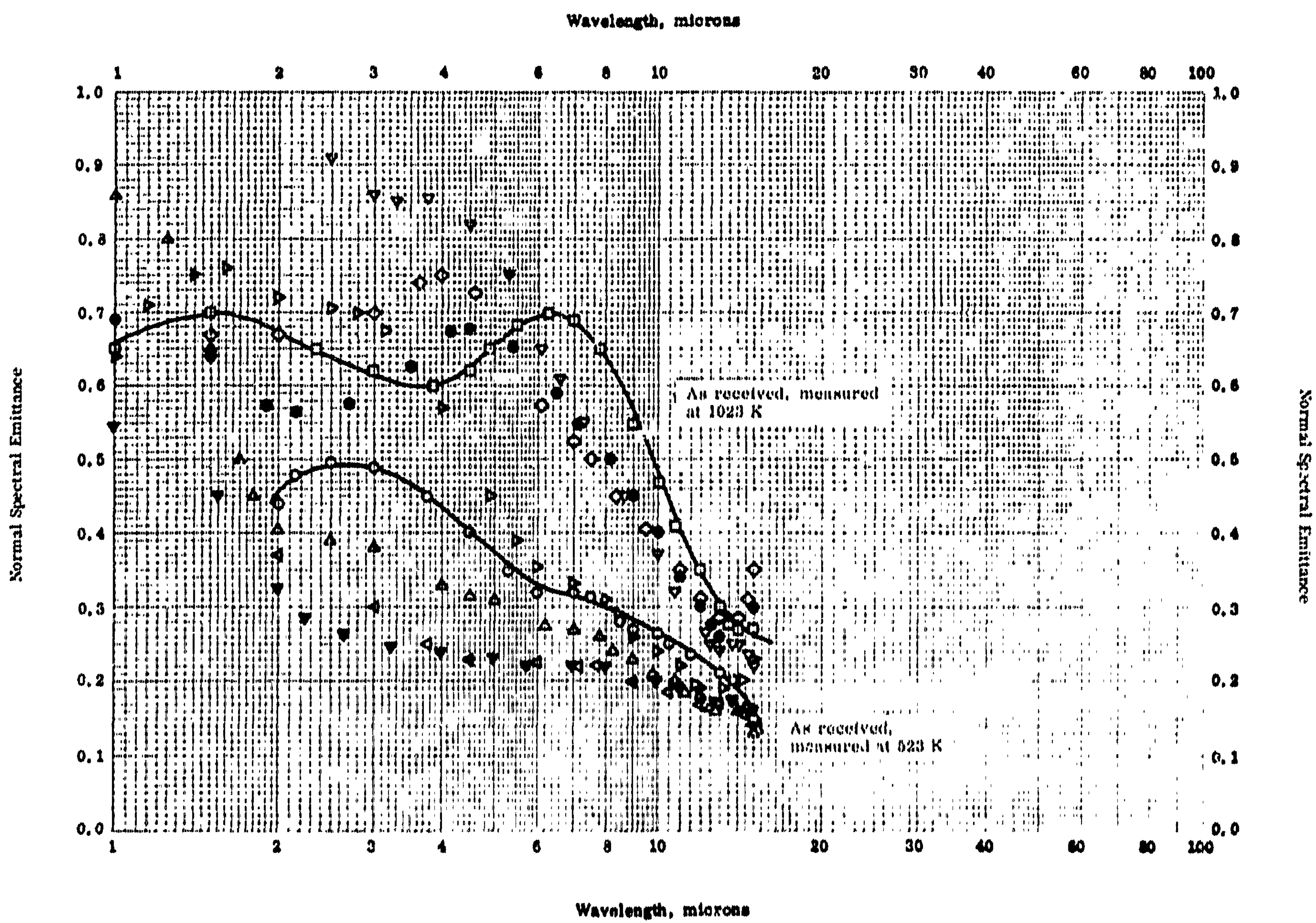
Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error%	Sample Specifications	Remarks
○	57-48	0.665	1122-1450	±10	Inconel X, nominal: 73 Ni, 15 Cr, 7 Fe, 2.5 Ti, 1 Nb, and 0.9 Al.	As received; measured in vacuum (5×10^{-4} mm Hg); first cycle heating.
△	57-48	0.665	1126-1422	±10	Same as above.	Same as above; first cycle cooling.
□	57-48	0.665	1122-1453	±10	Same as above.	Same as above; second cycle heating.
▽	57-48	0.665	1133-1333	±10	Same as above.	Same as above; second cycle cooling.
◇	57-48	0.665	1116-1450	±10	Same as above.	Cleaned with a liquid detergent; measured in vacuum (5×10^{-4} mm Hg); first cycle heating.
◁	57-48	0.665	1167-1308	±10	Same as above.	Same as above; first cycle cooling.
▷	57-48	0.665	1128-1444	±10	Same as above.	Same as above; second cycle heating.
◐	57-48	0.665	1125-1264	±10	Same as above.	Same as above; second cycle cooling.
▲	57-48	0.665	1114-1500	±10	Same as above.	Polished with fine polishing compound on a buffing wheel; measured in vacuum (5×10^{-4} mm Hg); first cycle heating.
◧	57-48	0.665	1114-1440	±10	Same as above.	Same as above; first cycle cooling.
▼	57-48	0.665	1280-1510	±10	Same as above.	Same as above; second cycle heating.
◆	57-48	0.665	1264-1391	±10	Same as above.	Same as above; second cycle cooling.
◀	57-48	0.665	1128-1460	±10	Same as above.	Oxidized in air at red heat for 36 min; measured in vacuum (5×10^{-4} mm Hg); first cycle heating.

(Continued onto next page)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i (continued)
(Inconel X)

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept Error%	Sample Specifications	Remarks
▶	57-48	0.665	1116-1330	±10	Same as above.	Same as above; first cycle cooling.
●	57-48	0.665	1214-1483	±10	Same as above.	Same as above; second cycle heating.
▲	57-48	0.665	1125	±10	Same as above.	Same as above; second cycle cooling.

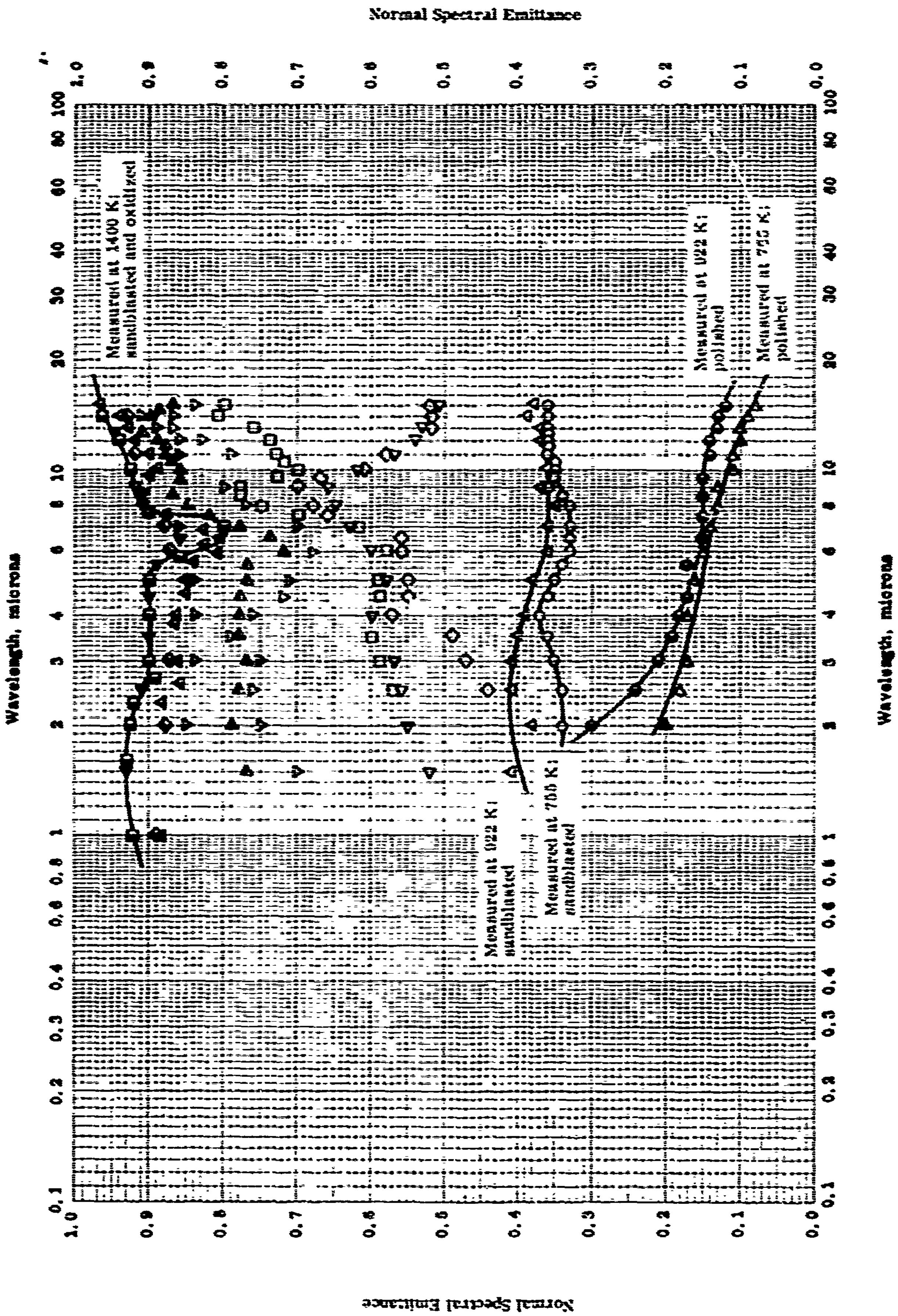


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Hastelloy X)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Hastelloy X)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	523.2	2.0-15.00		Hastelloy X: nominal: 57.8 - 49.4 Ni, 20.5 - 23 Cr, 17 - 20 Fe, 8 - 10 Mo, 1 Mn, 1 Si, 0.5 - 2.5 Co, 0.2 - 1 W, and 0.05 - 0.15 C; AMS 5536 C.	As received.
△	62-19	773.2	1.00-15.00		Same as above.	As received.
□	62-19	1023	1.00-15.00		Same as above.	As received.
▽	62-19	523.2	3.00-15.00		Same as above.	Heated in argon at 2000 F for 1/2 hr.
●	62-19	773.2	1.00-15.00		Same as above.	Heated in argon at 2000 F for 1/2 hr.
◇	62-19	1023	1.00-15.00		Same as above.	Heated in argon at 2000 F for 1/2 hr.
◁	62-19	523.2	2.00-15.00		Same as above.	Heated in a vacuum of 2.5×10^{-4} mm Hg at 2000 F for 1/2 hr.
▼	62-19	773.2	1.00-15.00		Same as above.	Heated in a vacuum of 2.5×10^{-4} mm Hg at 2000 F for 1/2 hr.
▷	62-19	1023	1.00-15.00		Same as above.	Heated in a vacuum of 2.5×10^{-4} mm Hg at 2000 F for 1/2 hr.

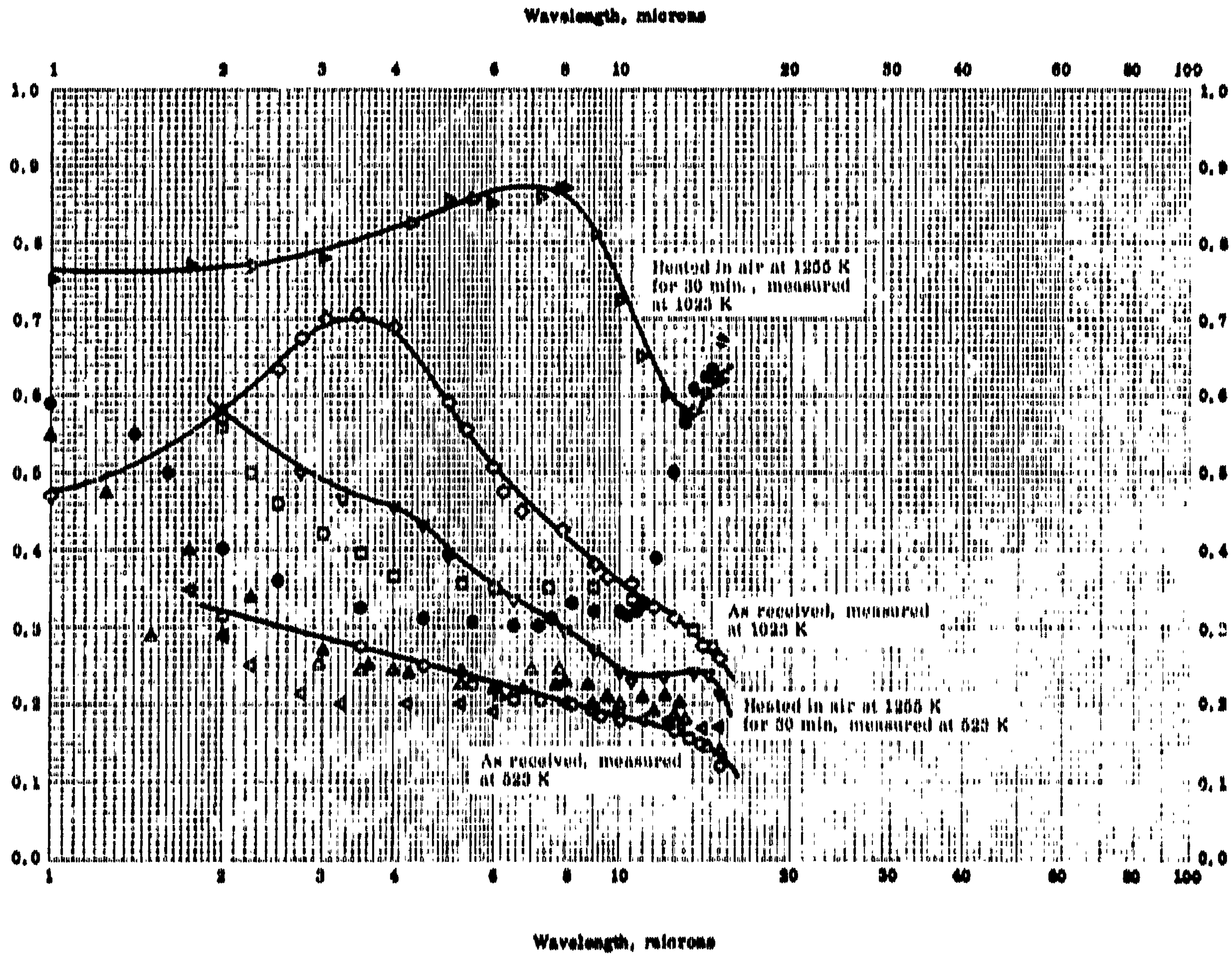


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣXi (Inconel)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX$_i$
(Inconel)

REFERENCE INFORMATION

Symbol	Ref.	Temp. ° K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	59-16	755	2-15	8	Inconel, nominal: 80 Ni, 14 Cr, and 6 Fe.	Sandblasted.
△	59-16	922	1.5-15	8	Inconel.	Same as above.
□	59-16	755	2.5-15	8	Inconel.	Electropolished, oxidized in air at 1255 K for 30 min.
▽	59-16	1255	1.5-15	8	Inconel.	Same as above.
◇	59-16	755	2.5-15	8	Inconel.	Sandblasted, oxidized in air at 1255 K for 30 min.
◁	59-16	1255	1.5-15	8	Inconel.	Same as above.
▷	59-16	755	2-15	8	Inconel.	Electropolished.
●	59-16	922	2-15	8	Inconel.	Same as above.
▲	60-16	1050	1-15		Inconel.	Sandblasted, oxidized in air at 1366 K for 2 hrs; measured in air.
■	60-16	1400	1-15	8	Inconel.	Same as above.
▼	59-15	873	2-14	14	Inconel.	Ultrasonically machined, oxidized in air at 873 K; measured in air.
◆	59-15	1273	1-14	14	Inconel.	Ultrasonically machined, oxidized in air at 1273 K; measured in air.
◀	60-19	1400	1.5-15	3	Inconel.	Sandblasted, oxidized in air at high temperature to form an opaque oxide coating.
▶	60-19	780	1.5-15	3	Inconel.	Same as above.

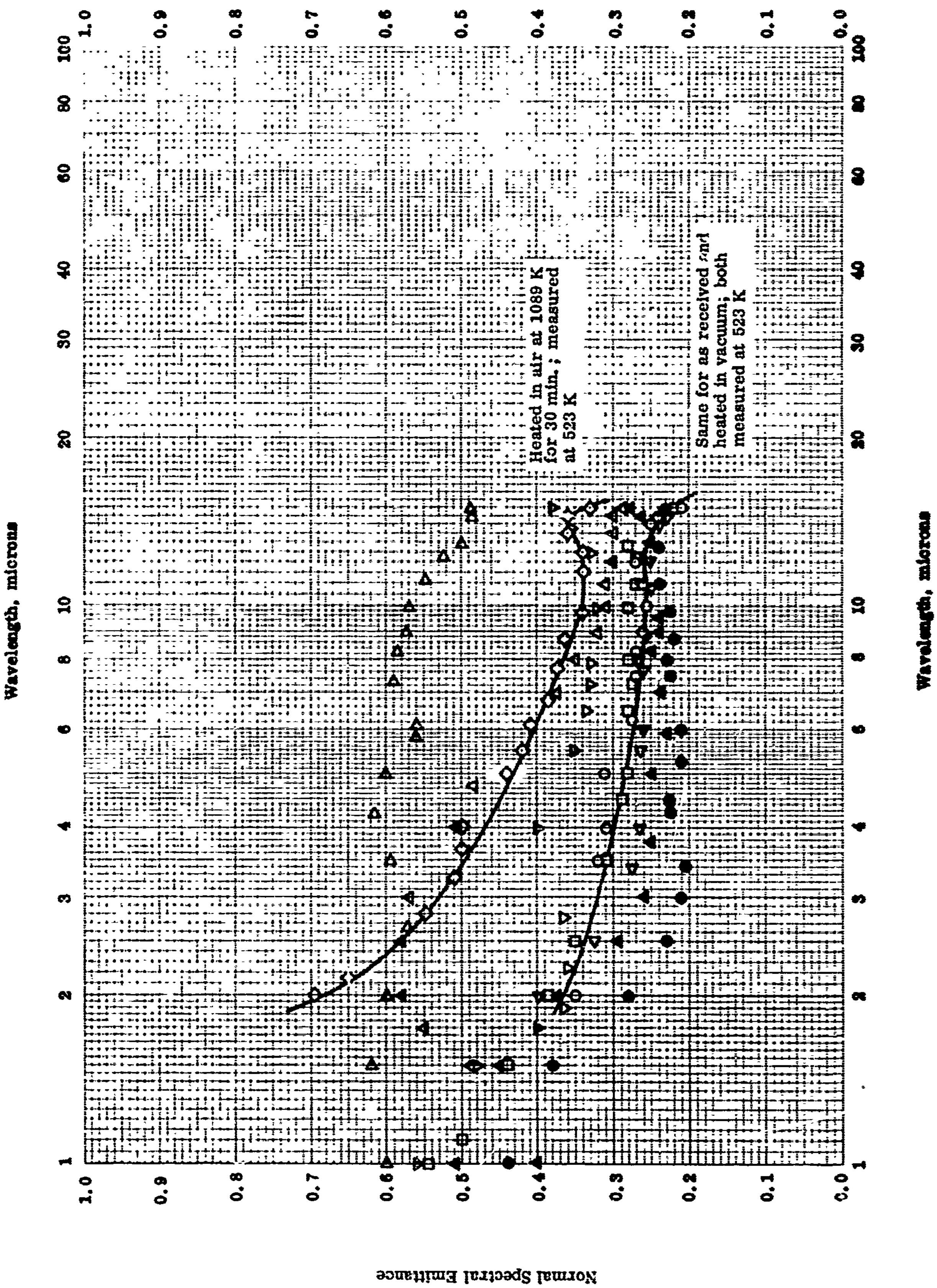


NORMAL SPECTRAL EMITTANCE — NICKEL + CHROMIUM + ΣX_i
(Inconel 702)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel 702)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	523.2	2.00-15.00		Commercial Inconel 702; nominal: 74.4 Ni, 17 Cr, 3.75 Al, 2 Fe, 1 Mn, 0.7 Si, 1 Ti, and 0.1 C.	As received.
△	62-19	773.2	1.50-15.0		Commercial Inconel 702.	As received.
◇	62-19	1023	1.00-15.00		Commercial Inconel 702.	As received.
▽	62-19	523.2	2.00-15.00		Commercial Inconel 702.	Heated in air at 1255 K for 30 min.
●	62-19	773.2	1.00-15.00		Commercial Inconel 702.	Heated in air at 1255 K for 30 min.
▷	62-19	1023	1.00-15.00		Commercial Inconel 702.	Heated in air at 1255 K for 30 min.
□	62-19	523.2	2.00-15.00		Commercial Inconel 702.	Heated in air 7.6 x 10^{-5} mm Hg vacuum at 1255 K for 30 min.
◁	62-19	773.2	1.00-15.00		Commercial Inconel 702.	Same treatment as above.
▲	62-19	1023	1.00-15.00		Commercial Inconel 702.	Same treatment as above.

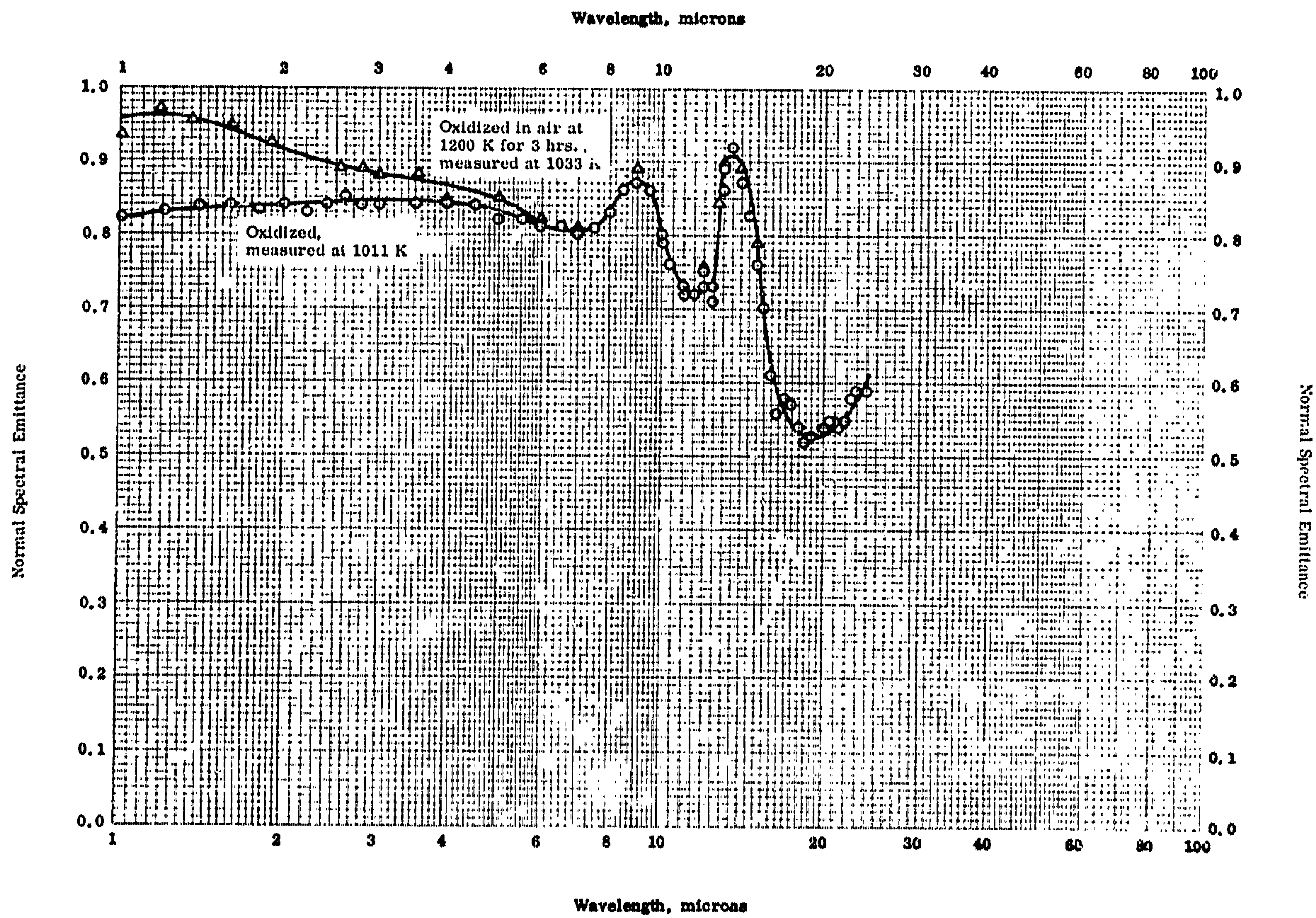


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel X)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel X)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	523.2	2.00-15.00		Inconel X; nominal: 72.9 Ni, 15 Cr, 7 Fe, 2.5 Fi, 1 Nb, 0.7 Al, 0.5 Mn, 0.4 Si, and 0.04 C; AMS5542.	As received.
□	62-19	773.2	1.00-15.00		Same as above.	As received.
△	62-19	1023	1.00-15.00		Same as above.	As received.
◇	62-19	523.2	2.00-15.00		Same as above.	Heated in air at 1089 K for 30 min.
▽	62-19	773.2	1.00-15.00		Same as above.	Heated in air at 1089 K for 30 min.
▷	62-19	1023	1.00-15.00		Same as above.	Heated in air at 1089 K for 30 min.
◁	62-19	523.2	2.00-15.00		Same as above.	Heated in a 6.8×10^{-5} mm Hg vacuum at 1089 K for 30 min.
●	62-19	773.2	1.00-15.00		Same as above.	Same treatment as the above specimen.
▲	62-19	1023	1.00-15.00		Same as above.	Same treatment as the above specimen.

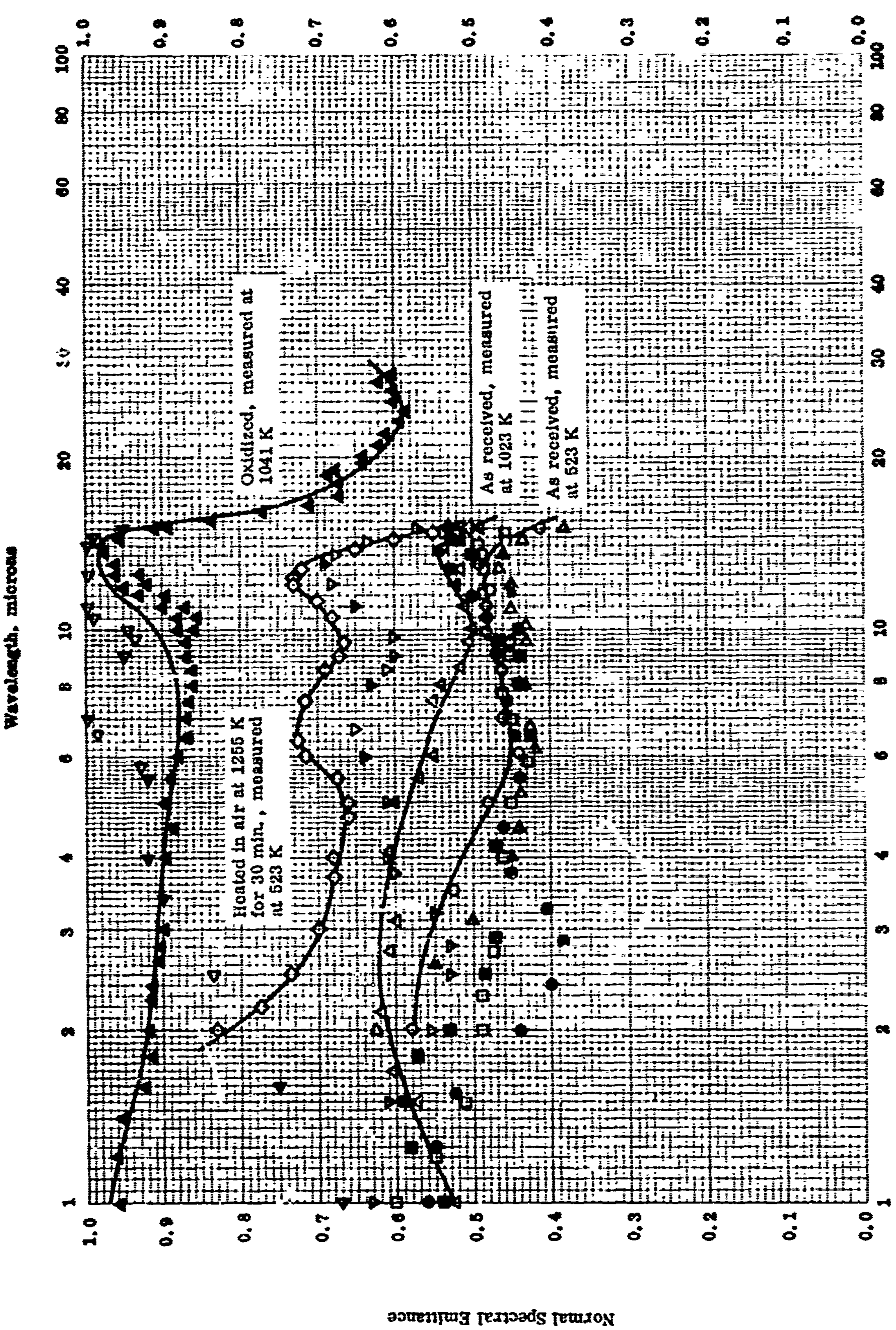


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

NORMAL SPECTRAL EMITTANCE -- N[illegible] + CHROMIUM + ΣX_i
(M 252)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error	Sample Specifications	Remarks
○	62-22	1010.9	1.00-24.00		M 252; nominal: 54.00 Ni, 19.00 Cr, 10.00 Co, 10.00 Mo, 0.10 C, 1.00 Mn, 0.70 Si, 2.50 Ti, 0.75 Al, 0.10 C, 1.00 Mn, 0.005 B, and 2.00 F.	Well oxidized.
△	60-20	1033.2	1.00-15.00		M 252; surface roughness: fine structure 2.5 μ amplitude.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs at 1200 K in air.

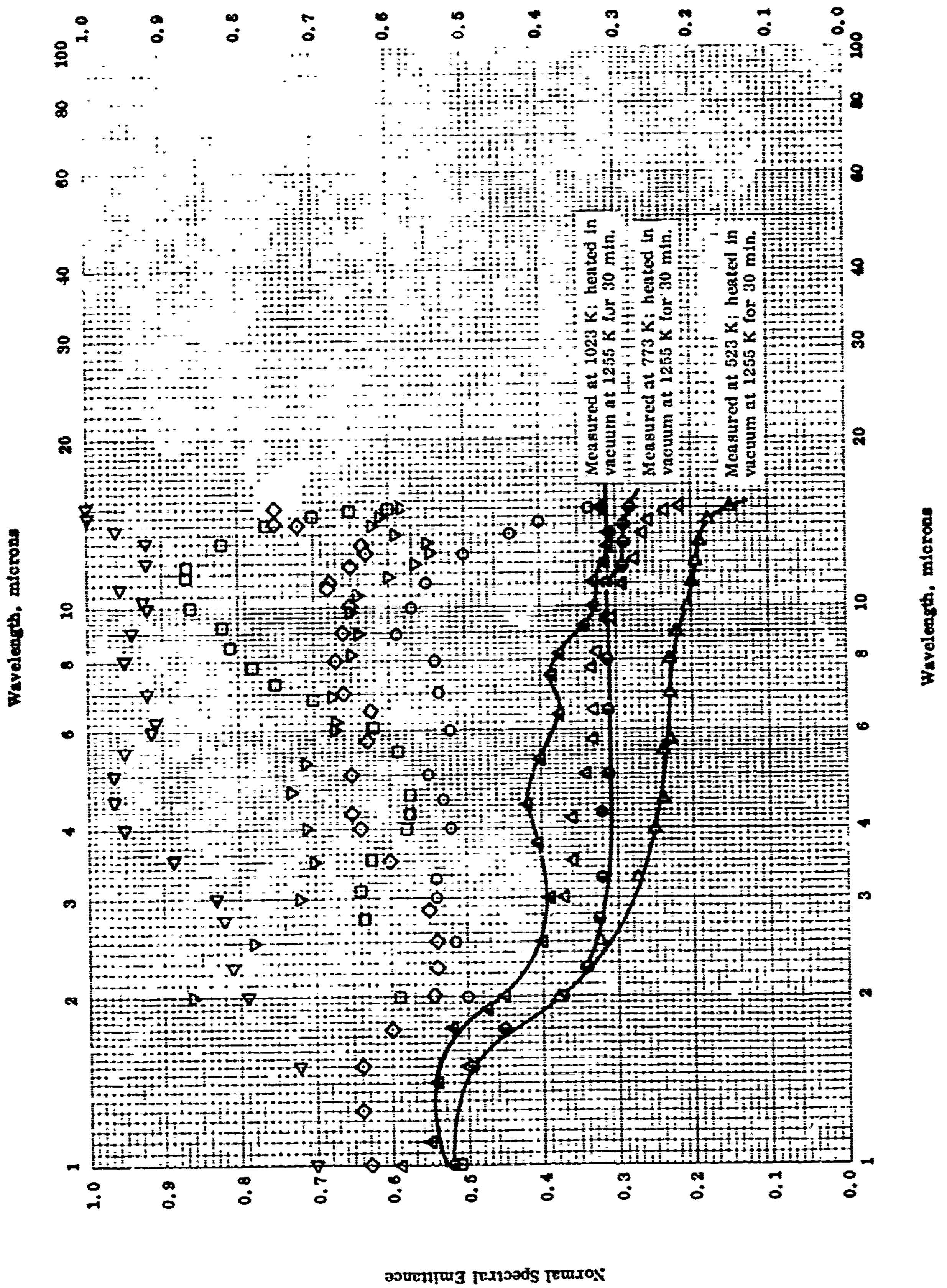


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣXi (Rene' 41)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Rene' 41)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	523.2	2.00-15.00		Commercial Rene' 41; nominal: 55.4 Ni, 19 Cr, 11 Co, 10 Mo, 3 Ti, 1.5 Al, 0.09 C, and 0.005 B.	As received.
□	62-19	773.2	1.00-15.00		Same as above.	As received.
△	62-19	1023	1.00-15.00		Same as above.	As received.
◇	62-19	523.2	2.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.
▽	62-19	773.2	1.00-1[illegible] 00		Same as above.	Heated in air at 1255 K for 30 min.
◁	62-19	1023	1.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.
▷	62-19	523.2	2.00-15.00		Same as above.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.
●	62-19	773.2	1.00-15.00		Same as above.	Same treatment as above.
■	62-19	1023	1.00-15.00		Same as above.	Same treatment as above.
▲	62-22	1041.5	1.00-24.00		Rene' 41.	Well oxidized.

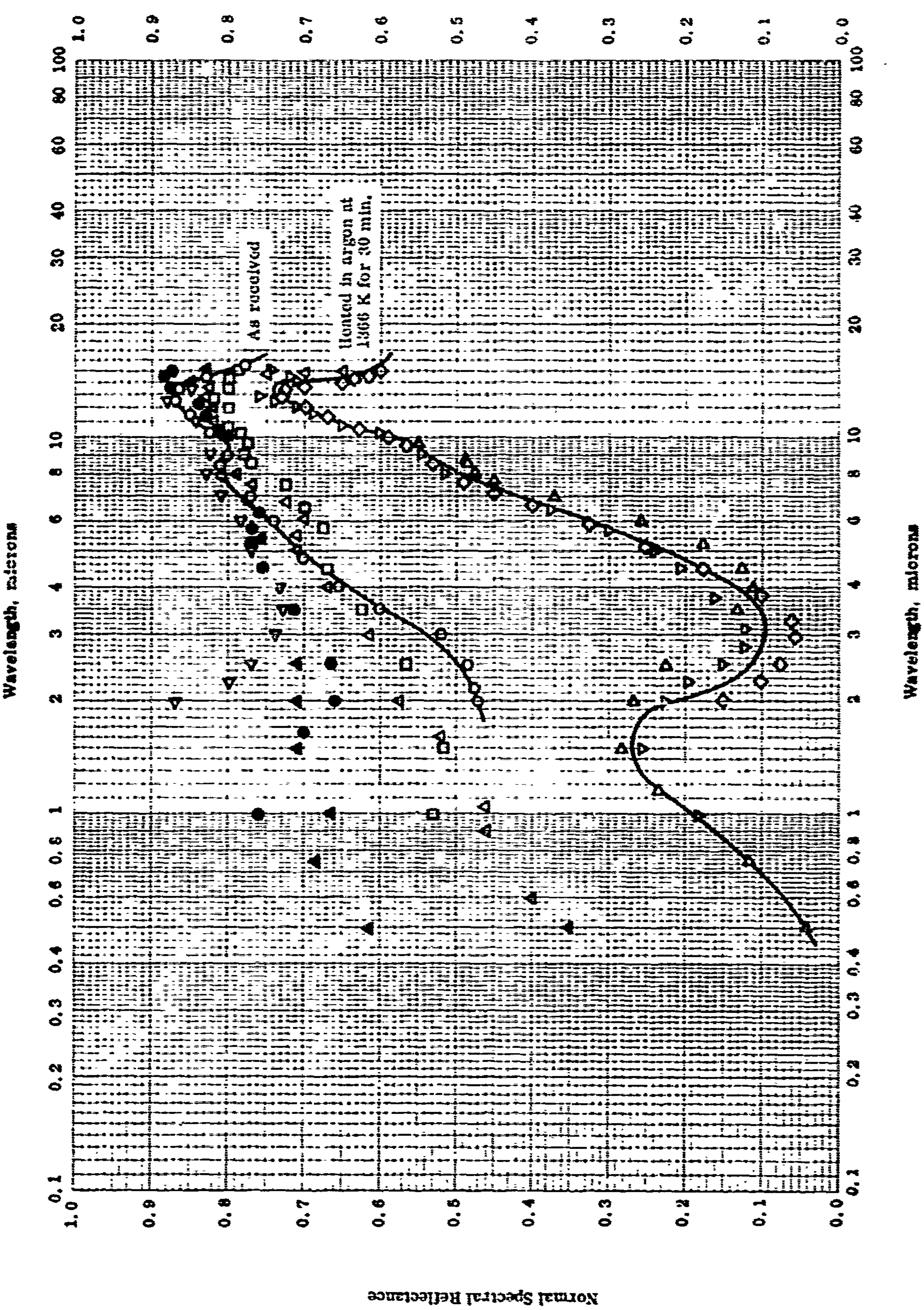


NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Udimet 500)

NORMAL SPECTRAL EMITTANCE -- NICKEL + CHROMIUM + ΣX_i
(Udimet 500)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	523	2.00-15.00		Commercial Udimet 500; 44.1 Ni, 20 Cr, 20 Co, 5 Mo, 4 Fe, 3.25 Ti, 2.5 Al, 0.75 Mn, 0.75 Si, 0.15 C, and 0.01 B.	As received.
△	62-19	773	1.00-15.00		Same as above.	Same as above, different specimen.
□	62-19	1023	1.00-15.00		Same as above.	Same as above, different specimen.
▽	62-19	523	2.00-15.00		Commercial Udimet 500.	Heated in air at 1255 K for 30 min.
◇	62-19	773	1.00-15.00		Same as above.	Same as above, different specimen.
◁	62-19	1023	1.00-15.00		Same as above.	Same as above, different specimen.
▷	62-19	523	2.00-15.00		Commercial Udimet 500.	Heated in a 7.6×10^{-5} vacuum at 1255 K for 30 min.
D	62-19	773	1.00-15.00		Same as above.	Same as above, different specimen.
▲	62-19	1023	1.00-15.00		Same as above.	Same as above, different specimen.

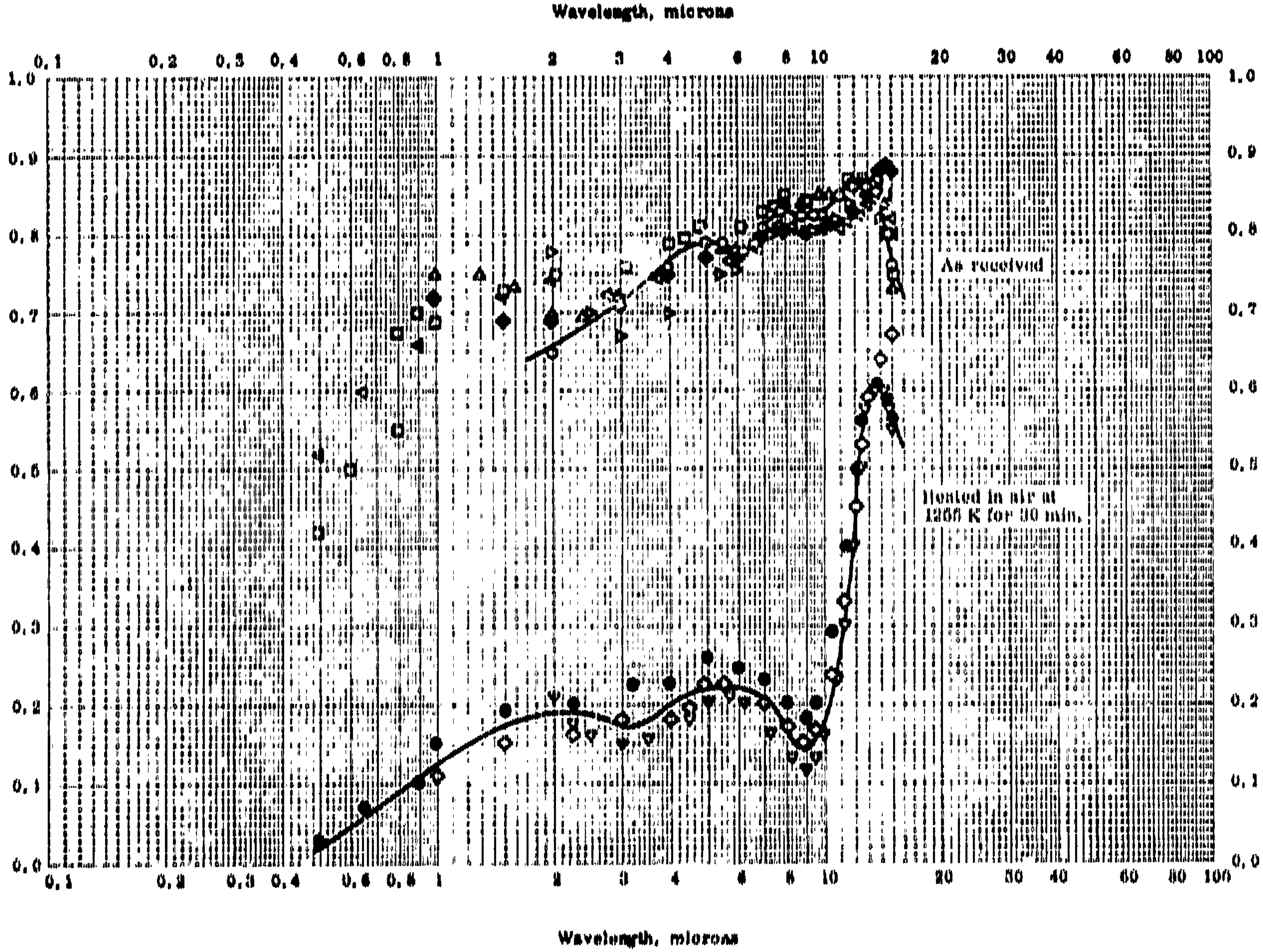


NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Hastelloy X)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Hastelloy X)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Exptl. Error %	Sample Specifications	Remarks
○	62-19	< 322	2.00-15.5		Hastelloy X: nominal: 47.8 Ni, 20.5 Cr, 17 Fe, 9 Mo, 1 Mn, 1 Si, 0.5 Co, 0.2 W and 0.05 C; AMS 5536 C.	As received; 523.2 K source.
□	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
△	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
◇	62-19	< 322	2.90-15.00		Hastelloy X: same as above.	Heated in argon at 1366 K for 30 min.; 523.2 K source.
▽	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▷	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
◁	62-19	< 322	2.00-15.00		Hastelloy X: same as above.	Heated in a vacuum of 2.5×10^{-4} mm Hg at 1366 K for 30 min.; 523.2 K source.
●	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▲	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.

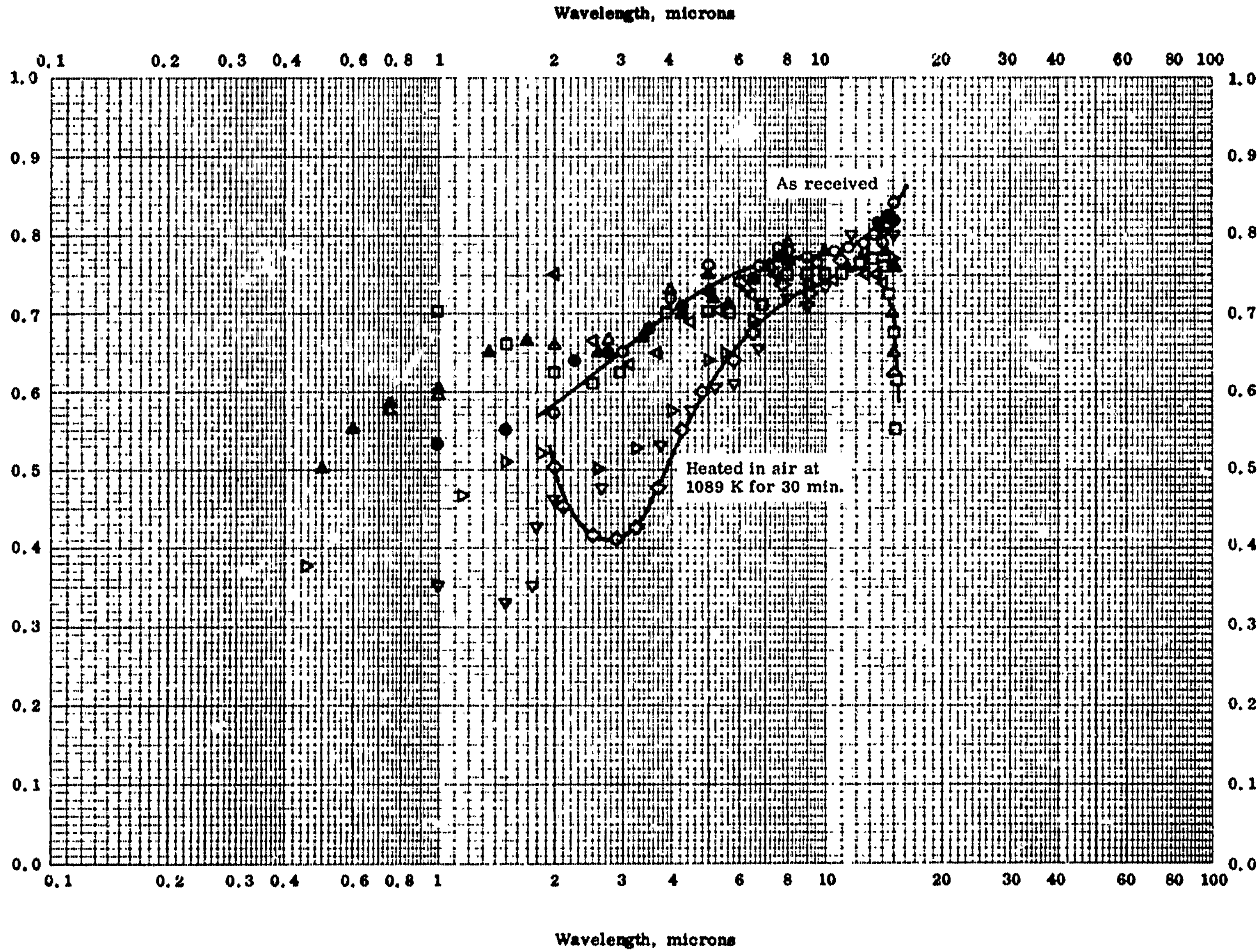


NORMAL SPECTRAL REFLECTANCE — NICKEL + CHROMIUM + ΣX
(Inconel 702)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel 702)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	< 322	2.00-15.00		Commercial Inconel 702; nominal: 74.4 Ni, 17 Cr, 3.75 Al, 2 Fe, 1 Mn, 1 Ti, 0.7 Si and 0.1 C.	As received; 523.2 K source.
△	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
□	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.
▽	62-19	< 322	2.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.; 523.2 K source.
◇	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
●	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.
▷	62-19	< 322	2.00-15.00		Same as above.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.; 523.2 K source.
◆	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◁	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.

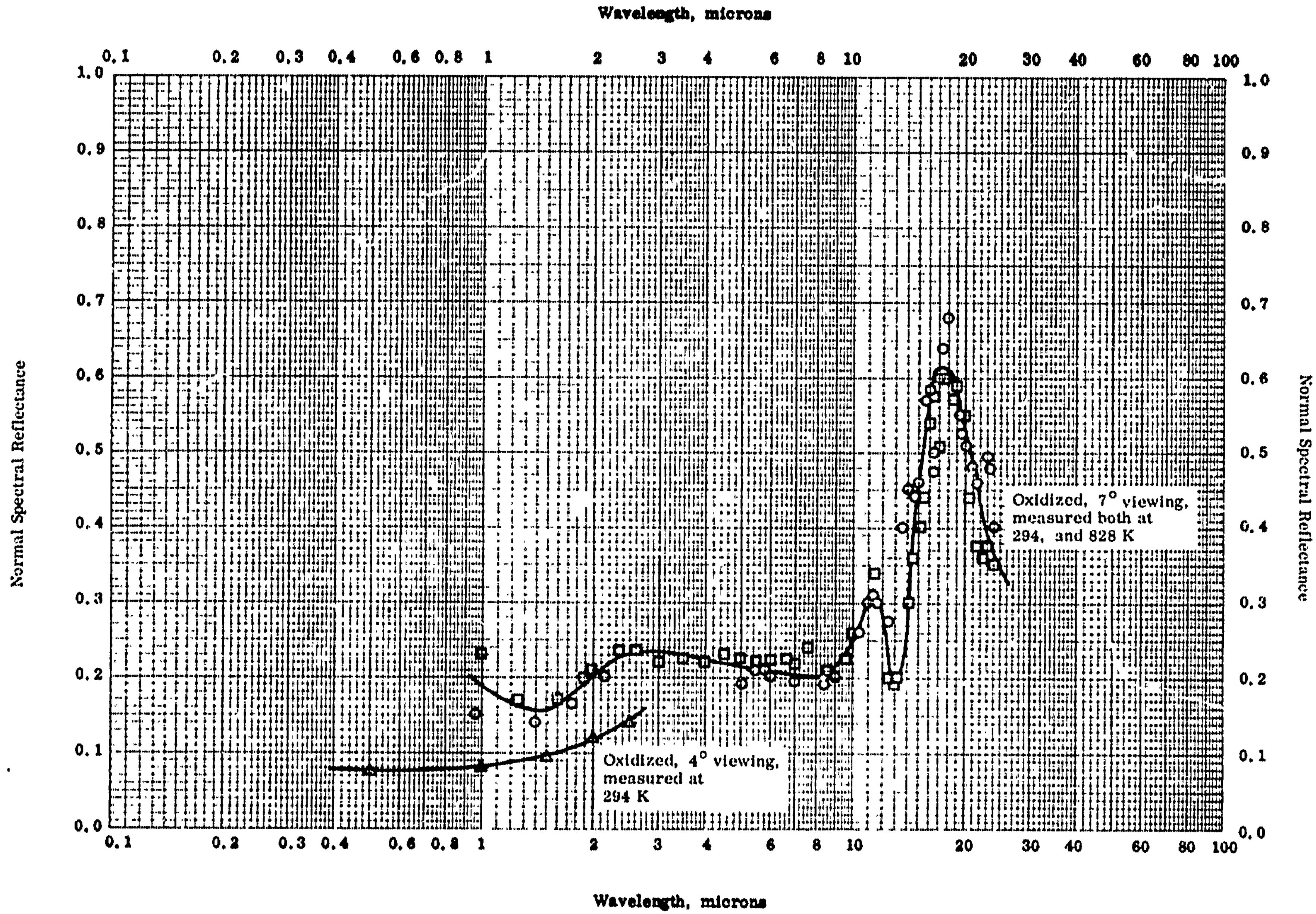


NORMAL SPECTRAL REFLECTANCE — NICKEL + CHROMIUM + ΣX_i
(Inconel X)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Inconel X)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	<322	2.00-15.00		Inconel X; nominal: 72.9 Ni, 15 Cr, 7 Fe, 2.5 Ti, 1 Nb, 0.7 Al, 0.4 Si, 0.04 C and 0.5 Mn; AMS 5542.	As received; 523.2 K source.
□	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
△	62-19	<322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.
◇	62-19	<322	2.00-15.00		Same as above.	Heated in air at 1089 K for 30 min.; 523.2 K source.
▽	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▷	62-19	<322	0.456-15.00		Same as above.	The above specimen with 1273.2 K source.
◁	62-19	<322	2.00-15.00		Same as above.	Heated in a 6.8×10^{-5} mm Hg vacuum for 30 min. at 1089 K; 523.2 K source.
●	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▲	62-19	<322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.

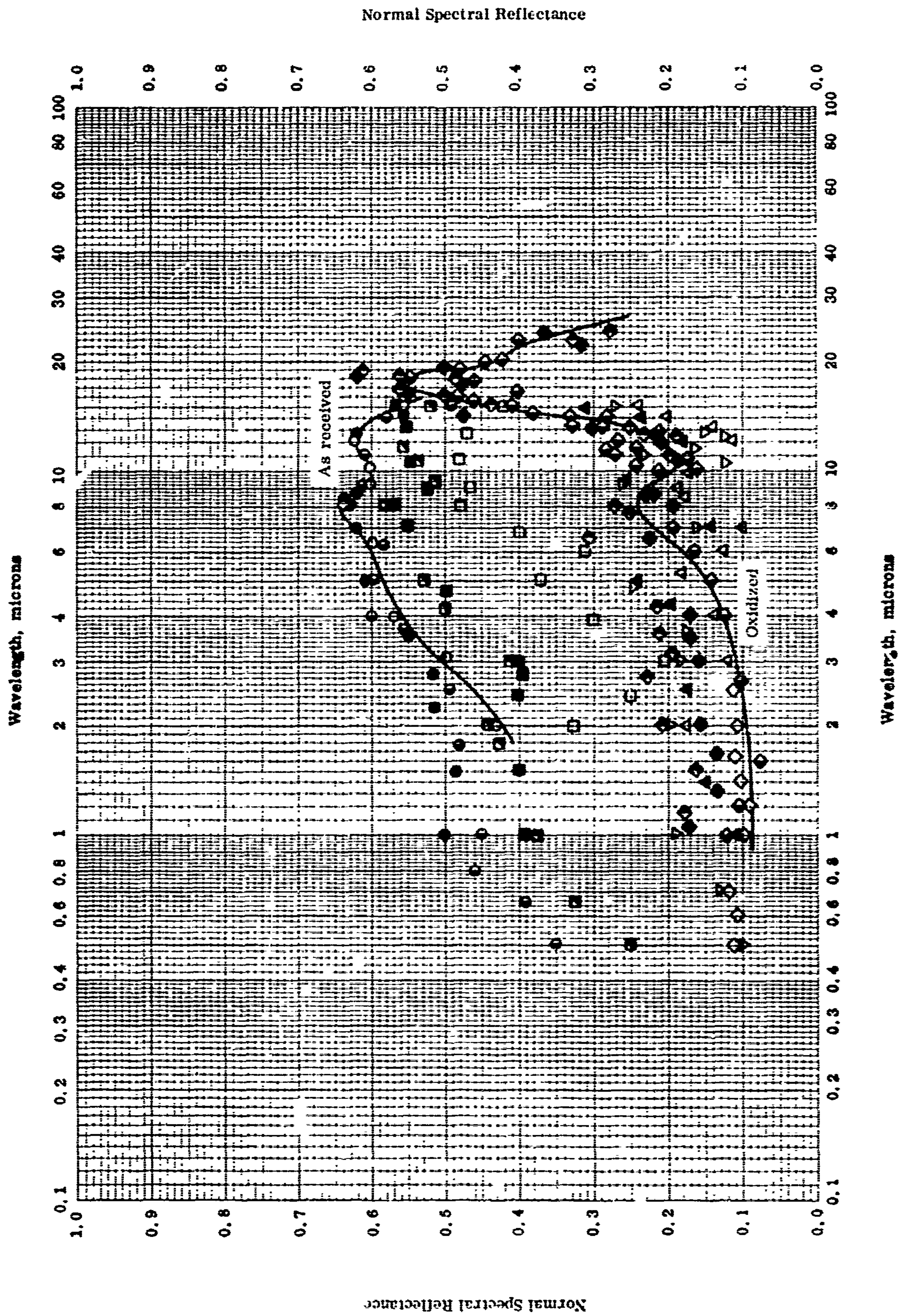


NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	60-20	294.3	0.97-24.0		M 252; nominal: 54.00 Ni, 19.00 Cr, 10.00 Co, 10.00 Mo, 0.10 C, 1.00 Mn, 0.005 B and 2.00 F; surface roughness: 2.5 μ amplitude.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized 3 hrs. at 1200 K in air; hemispherical illumination and 7° viewing.
□	60-20	827.6	1.0 -24.0		Same as above.	The above specimen measured at 827.6 K.
△	60-20	294.3	0.5 -2.5		M 252; surface roughness: 2.5 μamplitude.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr.; oxidized at 1200 F for 3 hrs. in air; hemispherical illumination and 4° viewing.

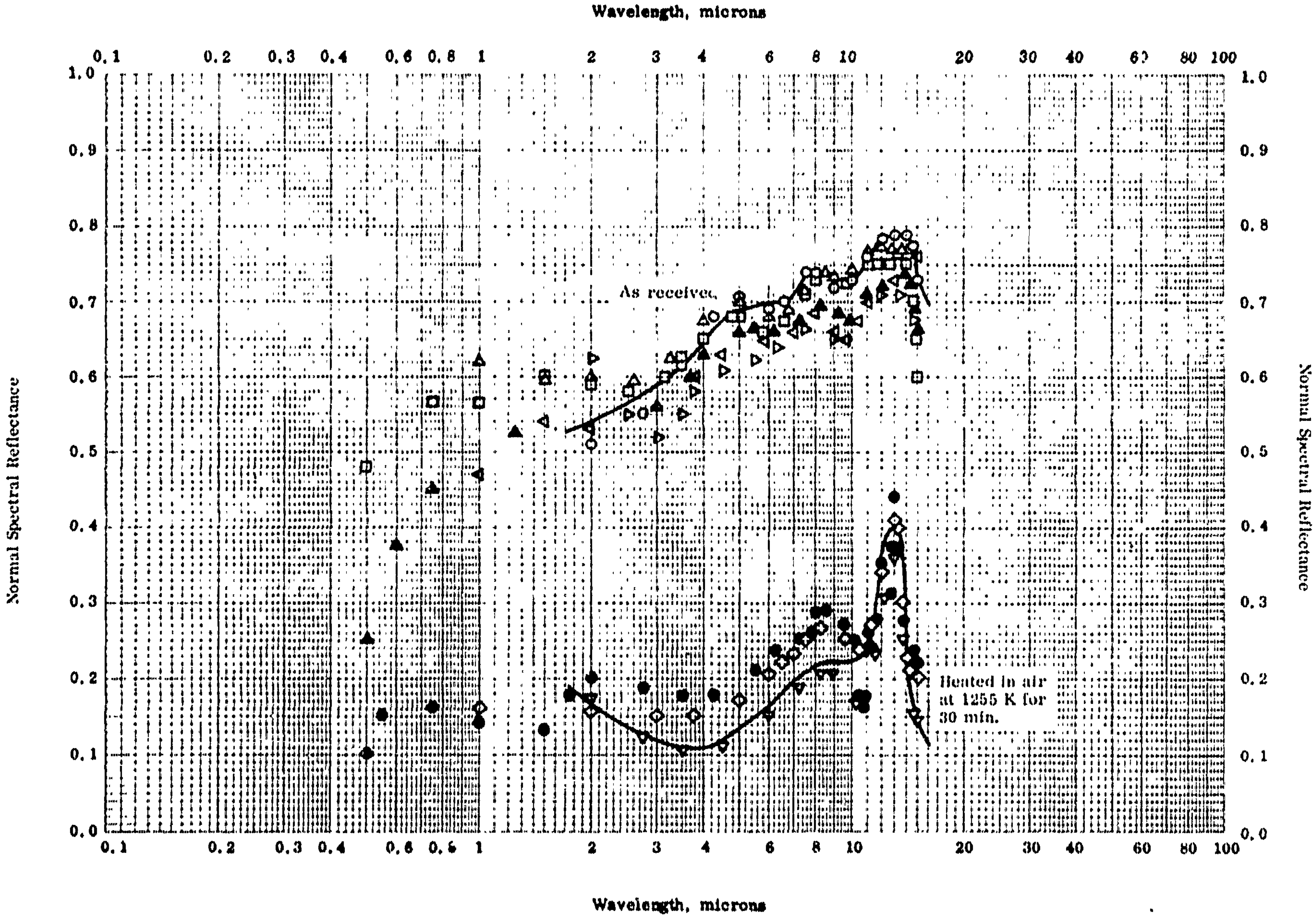


NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Reno' 41)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Rene' 41)

REFERENCE INFORMATION

Sym bol	Ref.	Temp. °F	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	-322	2.00-15.00		Commercial Rene 41; nominal: 55.4 Ni, 19 Cr, 11 Co, 10 Mo, 3 Ti, 1.5 Al, 0.09 C and 0.005 B.	As received; 523.2 K source.
●	62-19	-322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◐	62-19	-322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
△	62-19	-322	2.00-15.00		Same as above.	Heated in air at 1255 K for 30 min.; 523.2 K source.
▲	62-19	-322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▽	62-19	-322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
□	62-19	-322	2.00-15.00		Same as above.	Heated in a 7.6 x 10^{-5} mm Hg vacuum at 1255 K for 30 min.; 523.2 K source.
■	62-19	-322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◪	62-19	-322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
◇	60-20	294.3	0.5 -2.50		Rene' 41(SS8080); surface roughness: fine structure 2 μ high, coarse structure 5 μ at 200 μ intervals.	Cleaned in 1 to 1 water-diluated HF solution for 1 hr and oxidized 3 hrs at 1200 K in air; 4° illumination and hemispherical viewing.
◆	60-20	294.3	1.05-24.0		Rene' 41(SS8080); surface roughness: fine structure 2 μ high, coarse structure 5 μ at 200 μ intervals.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr and oxidized 3 hrs at 1200 K in air; hemispherical illumination and 7° viewing.
◈	60-20	828.1	1.15-24.0		Same as above.	The above specimen measured at 828.1 K.
◈	62-22	294.3	1.00-23.00		Same as above.	Well oxidized, hemispherical illumination and 7° viewing.

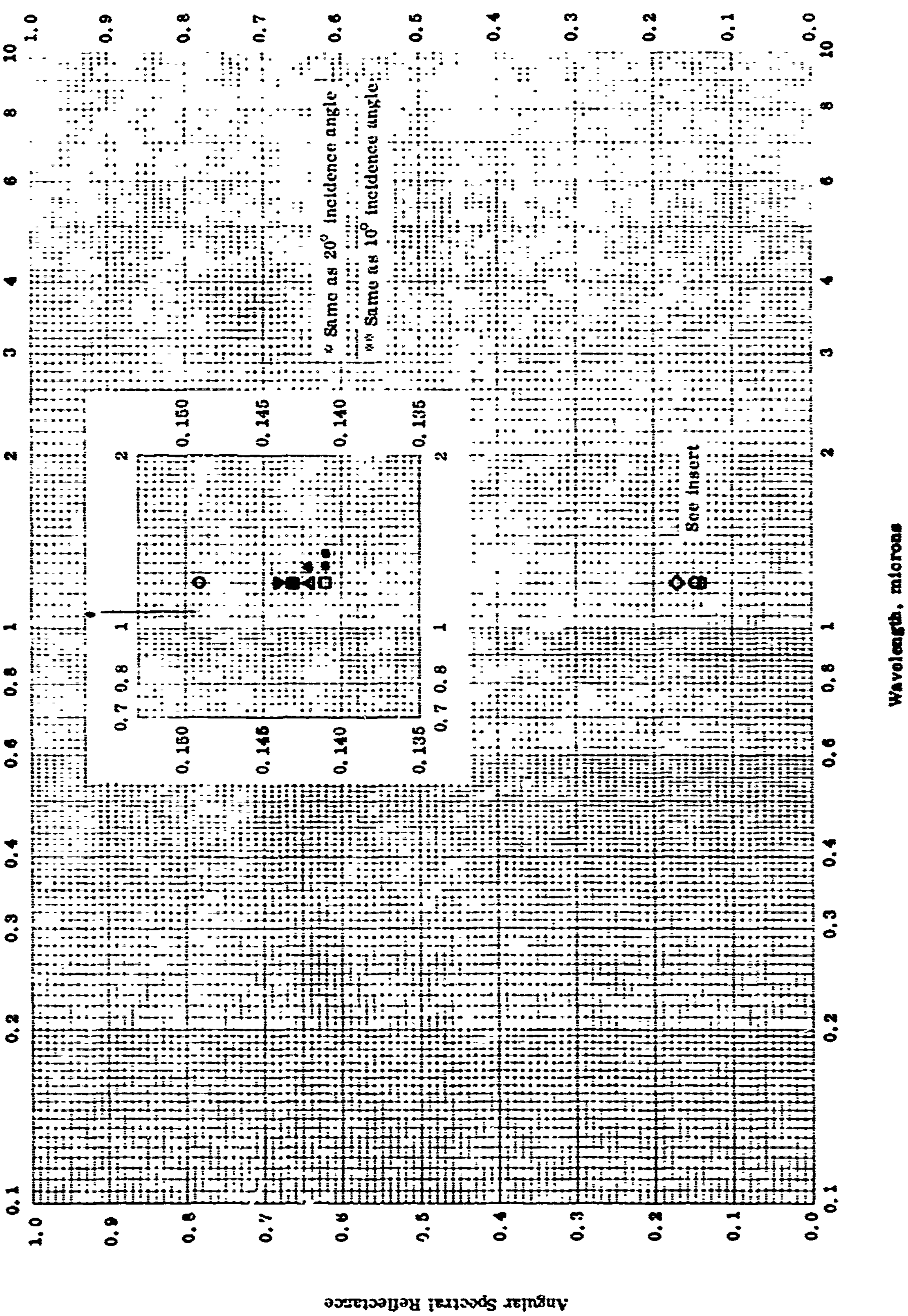


NORMAL SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(Udimet 500)

NORMAL SPECTRAL REFLECTANCE — NICKEL + CHROMIUM + ΣX_i
(Udimet 500)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	<322	2.00-15.00		Commercial Udimet 500, nominal: 44.1 Ni, 20 Cr, 20 Co, 5 Mo, 4 Fe, 3.25 Ti, 2.5 Al, 0.75 Mn, 0.75 Si, 0.15 C, and 0.01 B.	As received; 523.2 K source.
△	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
□	62-19	<322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
▽	62-19	<322	2.00-15.00		Commercial Udimet 500.	Heated in air at 1255 K for 30 min.; 523.2 K source.
◇	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
●	62-19	<322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.
▷	6[illegible]-19	<322	2.00-15.00		Commercial Udimet 500.	Heated in a 7.6 x 10^{-5} vacuum at 1255 K for 30 min.; 523.2 K source.
◁	62-19	<322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▲	62-19	<322	0.50-15.00		Same as above.	The above specimen with 1273 K source.



ANGULAR SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_1
(M 252)

ANGULAR SPECTRAL REFLECTANCE -- NICKEL + CHROMIUM + ΣX_i
(M 252)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	60-20	298	1.2		M 252; nominal: 54.00 Ni, 19.00 Cr, 10.00 Co, 10.00 Mo, 0.10 C, 1.00 Mn, 0.005 B, and 2.00 F; surface roughness: 2.5 μ amplitude.	Cleaned in 1 to 1 water-diluted HF solution for 1 hr; oxidized at 1200 F for 3 hrs in air; with MgO as reference; normal illumination and hemispherical viewing.
□	60-20	298	1.2		Same as above.	The above specimen; 10° illumination and hemispherical viewing.
△	60-20	298	1.2		Same as above.	The above specimen; 20° illumination and hemispherical viewing.
▲	60-20	298	1.2		Same as above.	The above specimen; 30° illumination and hemispherical viewing.
▽	60-20	298	1.2		Same as above.	The above specimen; 40° illumination and hemispherical viewing.
▼	60-20	298	1.2		Same as above.	The above specimen; 50° illumination and hemispherical viewing.
■	60-20	298	1.2		Same as above.	The above specimen; 60° illumination and hemispherical viewing.
◇	60-20	298	1.2		Same as above.	The above specimen; 70° illumination and hemispherical viewing.

PROPERTIES OF NICKEL + COBALT + ΣX_i

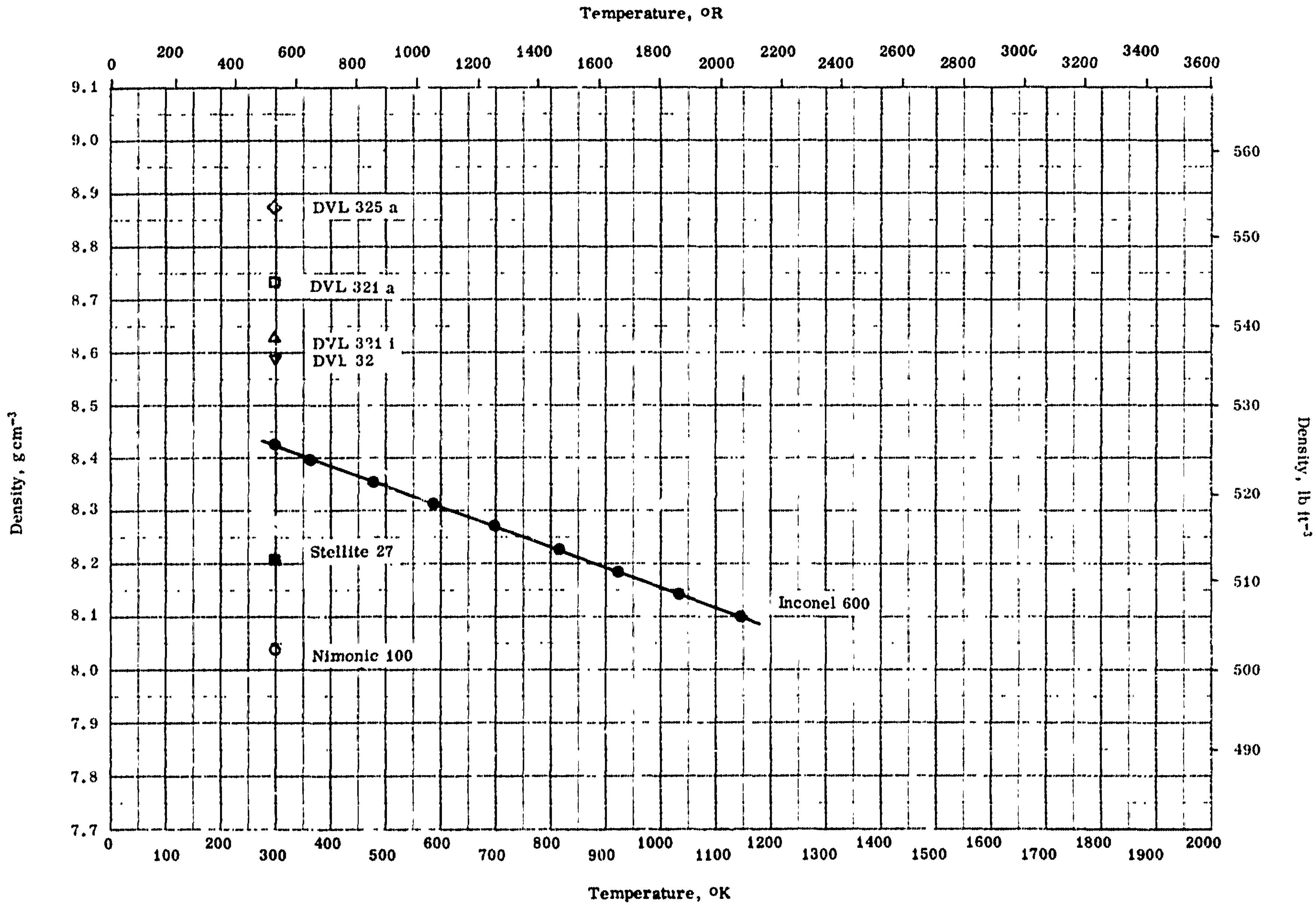
REPORTED VALUES

Density:	See figure	
Melting Point:	K	R
O Nimonic 100	1615 ± 35	2912 ± 63

PROPERTIES OF NICKEL + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-37	1583-1653		Nimonic 100; 18-22 Co, 10-12 Cr, 4.5-5.5 Mo, 4-6 Al, 2> Fe, 1-2 Ti, 0.5 > Si, and 0.3 > C.	

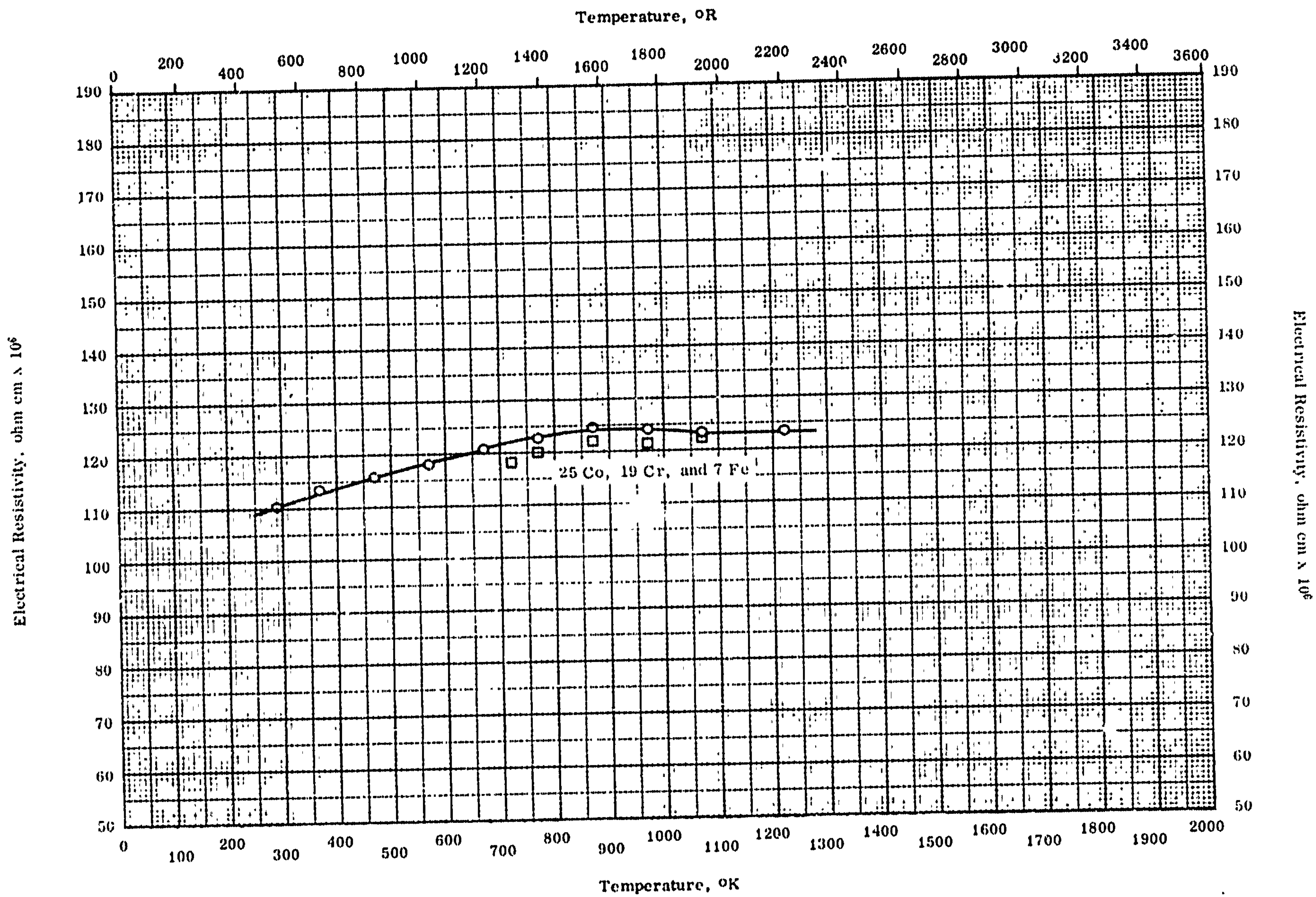


DENSITY -- NICKEL + COBALT + ΣX_i

DENSITY -- NICKEL + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-37	298		Nimonic 100; 18-22 Co, 10-12 Cr, 4.5 - 5.5 Mo, 4 - 6 Al, 2 > Fe, 1-2 Ti, 0.5 > Si, and 0.30 > C.	
□	47-3	293		DVL 321 a (German Design.); 34.1 Ni, 25.4 Co, 14.6 Cr, 13.8 Fe, 5.0 Mo, 4.75 W, 1.3 Ta, 0.54 Mn, 0.45 Si and 0.04 C.	
△	47-3	293		DVL 321 i (German Design.); 34.2 Ni, 25.5 Co, 14.8 Cr, 13.7 Fe, 5.2 Mo, 4.5 W, 1.08 Ti, 0.62 Mn, 0.40 Si, and 0.04 C.	
◇	47-3	293		DVL 325 a (German Design.); 34.3 Ni, 25.1 Co, 14.9 Cr, 4.9 Mo, 4.88 Ta, 4.54 W, 0.53 Mn, 0.49 Si, and 0.04 C.	
▽	47-3	293		DVL 32 (German Design.); 35.2 Ni 24.5 Co, 15.4 Fe, 14.6 Cr, 4.7 W, 4.46 Mo, 0.71 Mn, 0.44 Si, and 0.03 C.	
■	50-3	298		Haynes Stellite Aloy No. 27; 30.0 min Co, 23.0 - 29.0 Cr, 5.0 - 7.0 Mo, 2.0 max Fe, and 0.35 - 0.50 C.	
●	62-7	300-1145		Inconel 600; 73.55 Ni + Co, 16 Cr, 7.55 Fe, 2.30 Nb + Ta, 0.3 Si, 0.2 Mn, 0.04 C, 0.03 Cu, and 0.005 S.	

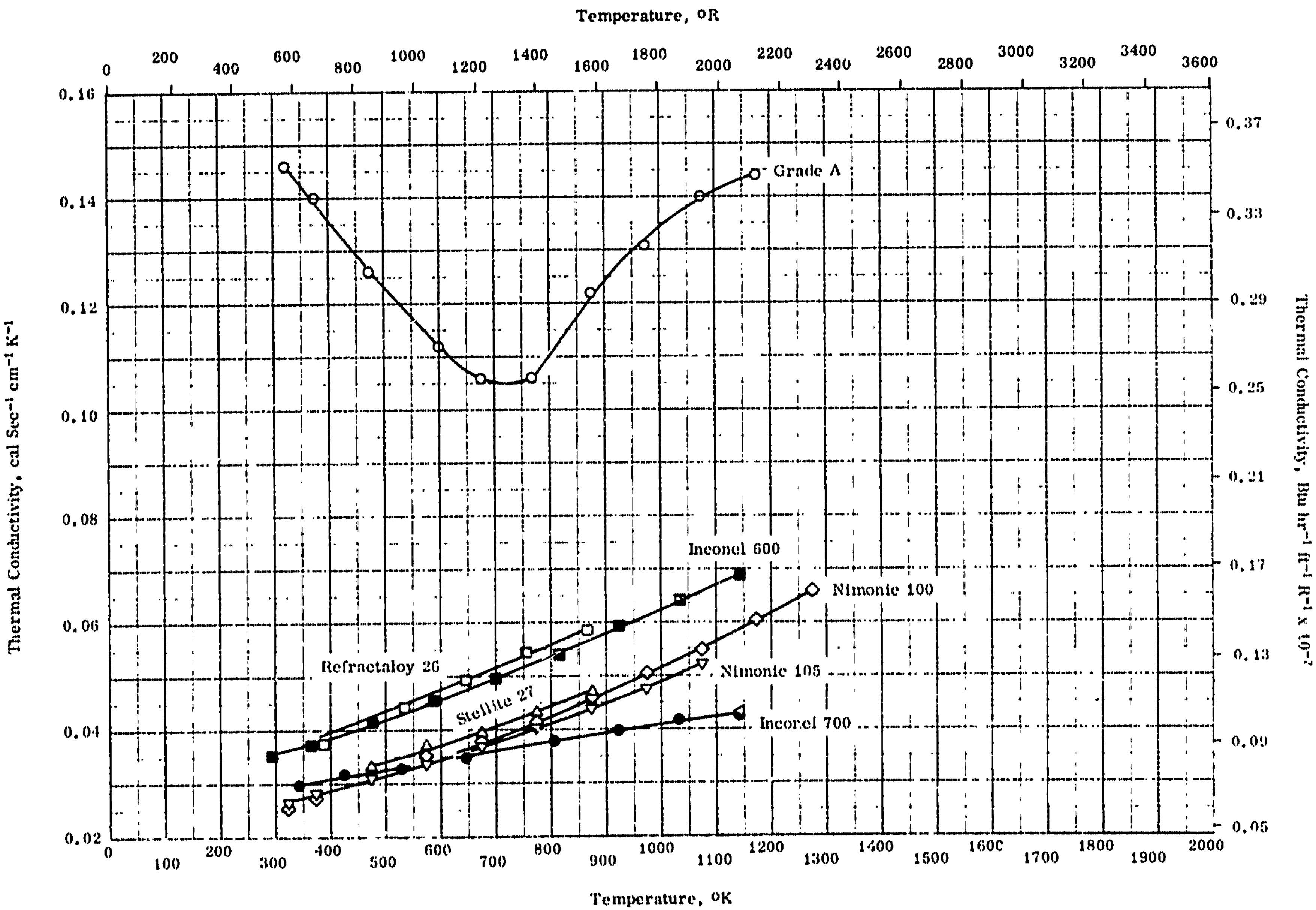


ELECTRICAL RESISTIVITY -- NICKEL + COBALT + ΣX_i

ELECTRICAL RESISTIVITY -- NICKEL + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	42-2	293-1223		46.1 Ni, 24.86 Co, 18.74 Cr, 7.02 Fe, and 2.19 Ti	First heating at 12 C min^{-1}; author reports same values offer the following heat treatment during test; heated to 950 C in 75 min. held 1 hr at 950 C, cooled to 450 C in 4 min., heated to 600 C in 7 min. and held 16 hrs at 600 C; cooling during test at 2.5 C $min.^{-1}$.
□	42-2	618-1223		Same as above.	First cooling at 75 C $min.^{-1}$ after the above mentioned first heating to 950 C in 75 min.

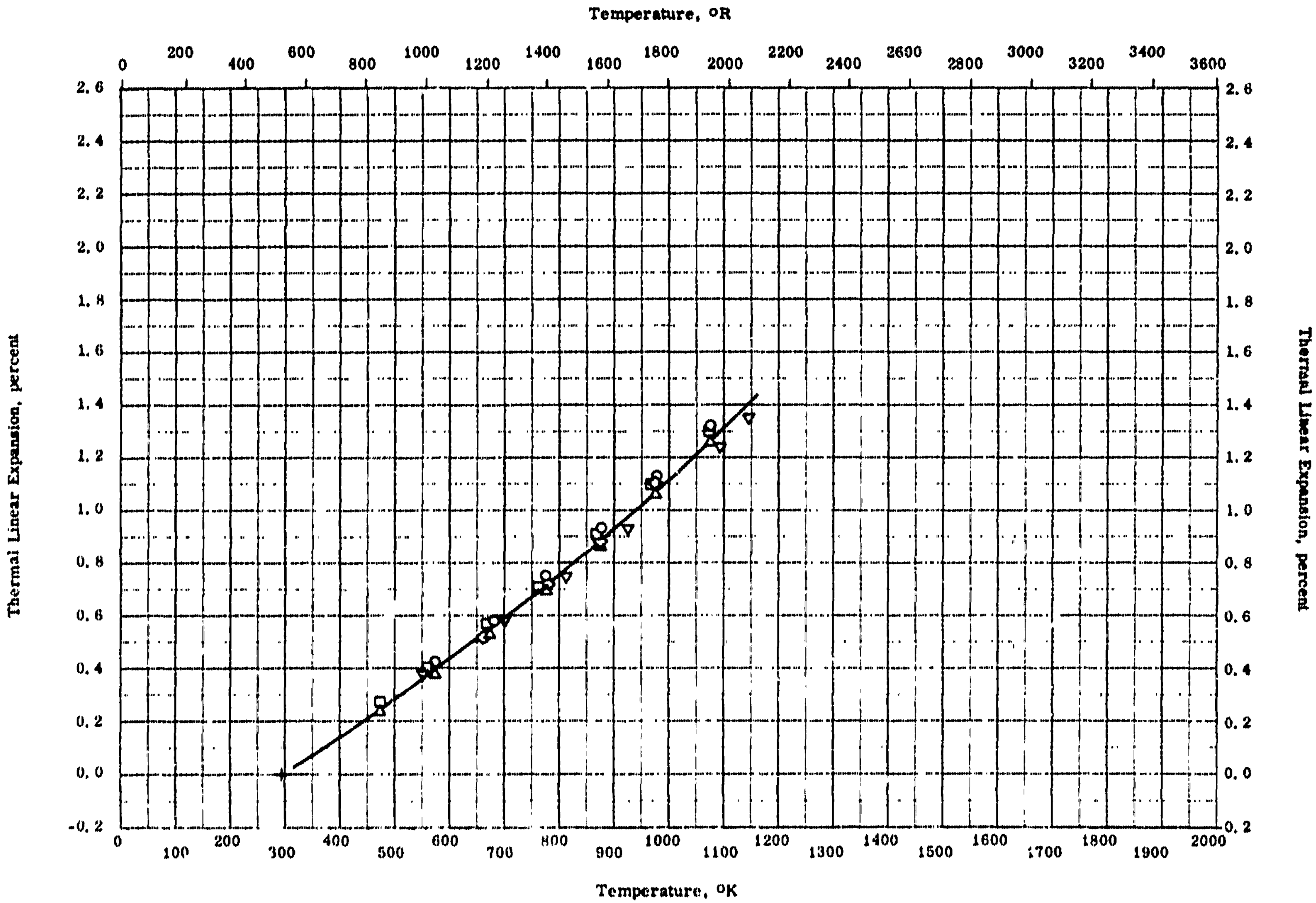


THERMAL CONDUCTIVITY -- NICKEL + COBALT + ΣX_i

THERMAL CONDUCTIVITY -- NICKEL + COBALT + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-2	323-1173		Grade A; 98.19 Ni, 0.746 Co, 0.705 Mo, 0.26 Fe, 0.063 Cu, and 0.036 P.	
□	51-3	386-867	±4	Refractaloy 26; 37.0 Ni, 20.0 Co, 18.67 Fe, 18.0 Cr, 3.0 Mo, 3.0 Ti, 0.3 Al, and 0.03 C.	
△	47-2	473-873		Stellite No. 27, (AMS-5378, NRDC-60); 30 < Co, 23-29 Cr, 5.0-7.0 Mo, 2.0 > Fe, and 0.35-0.50 C; density 513 lb ft^{-3}.	
▽	60-6	323-1073		Nimonic 100; 20 Co, 11.1 Cr, 5.22 Al, 5.0 Mo, 1.07 Ti, 0.28 Si, 0.24 C, 0.04 Cu, and 0.03 Mn.	
◇	60-6	323-1273		Nimonic 105; 18-22 Co, 14-16 Cr, 4-6 Al, 4-6 Mo, 3.0 max Fe, 0.5-2.0 Ti, 1.0 max Mn, 0.5 max Cu, and 0.3 max C.	
●	58-10	343-1144		45 Ni, 28 Co, 15 Cr, 3 Mo, 3 Al, 2.2 Ti, 0.7 Fe, 0.25 Si, 0.16 C, 0.10 Mn, and 0.008 S.	Last three points extrapolated.
■	62-7	294-1144		Inconel 600; 73.55 Ni + Co, 16 Cr, 7.55 Fe, 2.30 Nb + Ta, 0.3 Si, 0.2 Mn, 0.04 C, 0.03 Cu, and 0.005 S.	
◁	60-8	1144		Inconel 700; 46.0 Ni, 29 Co, 15 Cr, 3.2 Al, 3 Mo, 2.2 Ti, 0.8 Fe, 0.25 Si, 0.13 C, and 0.08 Mn.	Wrought.

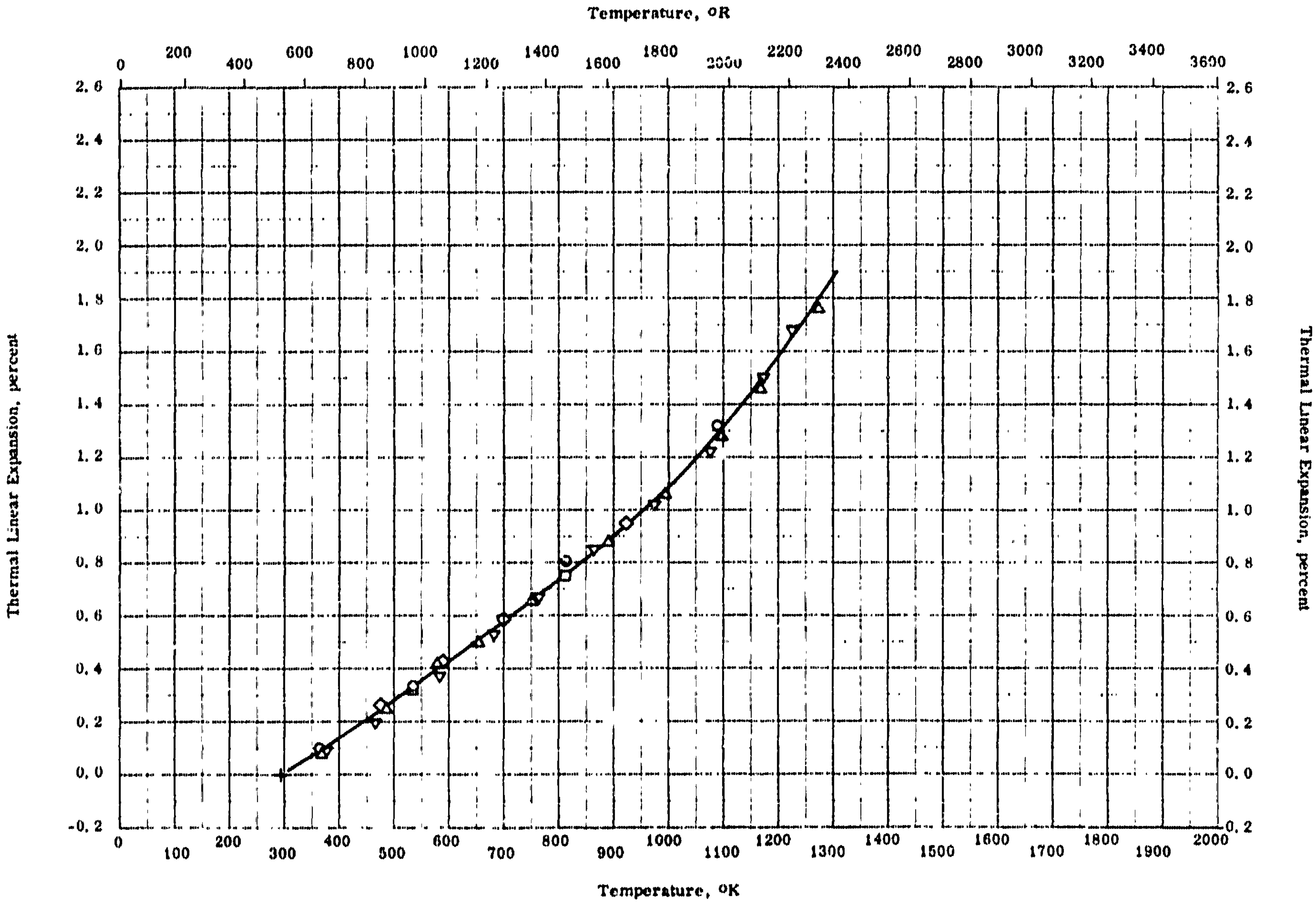


THERMAL LINEAR EXPANSION -- NICKEL + COBALT + ΣX_i
($34 < Ni < 38$)

THERMAL LINEAR EXPANSION -- NICKEL + COBALT + ΣX_i
(34 < Ni < 38)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error	Sample Specifications	Remarks
○	47-3	473-1073		DVL 321 a (German Design.); 34.1 Ni, 25.4 Co, 14.6 Cr, 13.8 Fe, 5.0 Mo, 4.75 W, 1.35 Ta, 0.54 Mn, 0.45 Si, and 0.04 C; density 545.2 lb ft^{-3}.	Rolled.
□	47-3	473-1073		DVL 321 i (German Design.); 34.2 Ni, 25.5 Co, 14.8 Cr, 13.7 Fe, 5.2 Mo, 4.5 W, 1.08 Ti, 0.62 Mn, 0.40 Si, and 0.04 C; density 538.7 lb ft^{-3}.	Rolled.
△	47-3	473-1073		DVL 325 a (German Design.); 34.3 Ni, 25.1 Co, 14.9 Cr, 4.9 Mo, 4.88 Ta, 4.54 W, 0.53 Mn, 0.49 Si, and 0.04 C; density 554.1 lb ft^{-3}.	Rolled.
◇	47-3	473-1073		DVL 32 (Ger. Design.); 35.2 Ni, 24.5 Co, 15.4 Fe, 14.6 Cr, 4.7 W, 4.46 Mo, 0.71 Mn, 0.44 Si, and 0.03 C; density 536.3 lb ft^{-3}.	Rolled.
▽	50-3	589-1145		Haynes Stellite (AMS-5378) Alloy No. 27 NR-60; nominal: 30.0 Co min, 23.0 - 29.0 Cr, 5.0 - 7.0 Mo, 2.0 Fe max, and 0.35 - 0.50 C; density 513 lb ft^{-3}.	

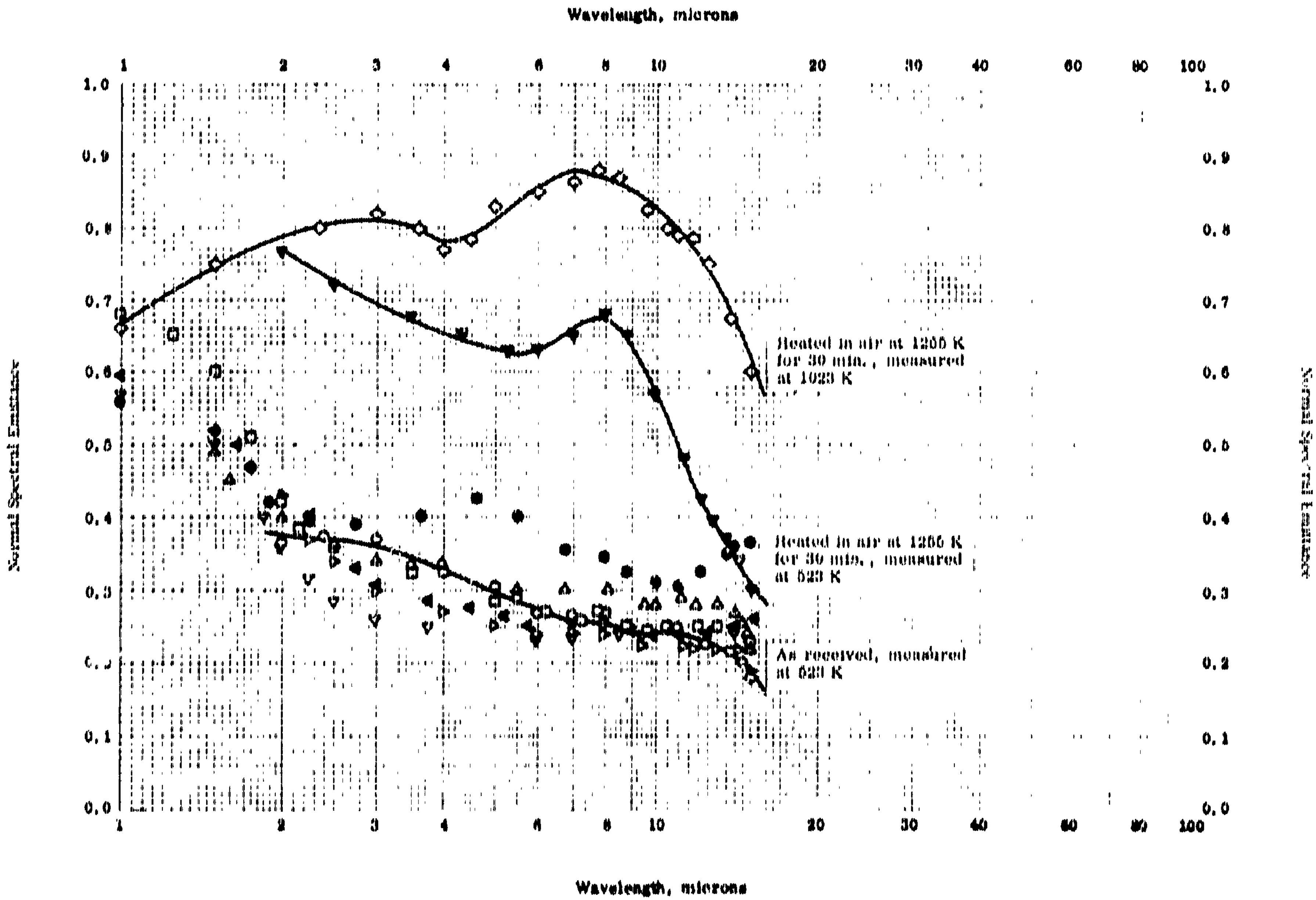


THERMAL LINEAR EXPANSION -- NICKEL + COBALT + ΣX_i
($40 < Ni < 95$)

THERMAL LINEAR EXPANSION -- NICKEL + COBALT + ΣX_i
(46< Ni < 95)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error	Sample Specifications	Remarks
▽	42-2	293-1223		46.1 Ni, 24.86 Co, 18.74 Cr, 7.02 Fe and 2.19 Ti.	
△	56-37	373-1246		Nimonic 100; nominal; 18 - 22 Co, 10 - 12 Cr, 4.5 - 5.5 Mo, 4 - 6 Al, < 2 Fe, 1 - 2 Ti, < 0.5 Si and < 0.3 C; density 502 lb ft^{-3}.	
○	65-4	294-1089		Nickel 204, International Nickel Co.; nominal; 95.2 Ni, 4.50 Co, 0.20 Mn, 0.06 C, 0.05 Fe, 0.02 Cu, 0.02 Si and 0.005 S; density 0.321 lb $in.^{-3}$	
□	65-4	294-1089		Inconel 700, International Nickel Co.; nominal 46.0 Ni, 28.5 Co, 15.0 Cr, 3.75 Mo, 3.00 Al, 2.20 Ti, 0.70 Fe, 0.30 Si, 0.12 C, 0.10 Mn, 0.05 Cu and 0.007 S, density 0.295 lb $in.^{-3}$ and M.P. 2375 - 2490 F.	
◇	63-28	254-922		AISI-690, 38 Ni, 20 Co, 18 Cr, 10 Fe, 3.2 Mo, 2.75 Ti, 1.0 Si, 0.8 Mn, 0.2 Al and 0.03 C, density 8.21 g cm^{-3} and M.P. 2450 - 2500 F.	

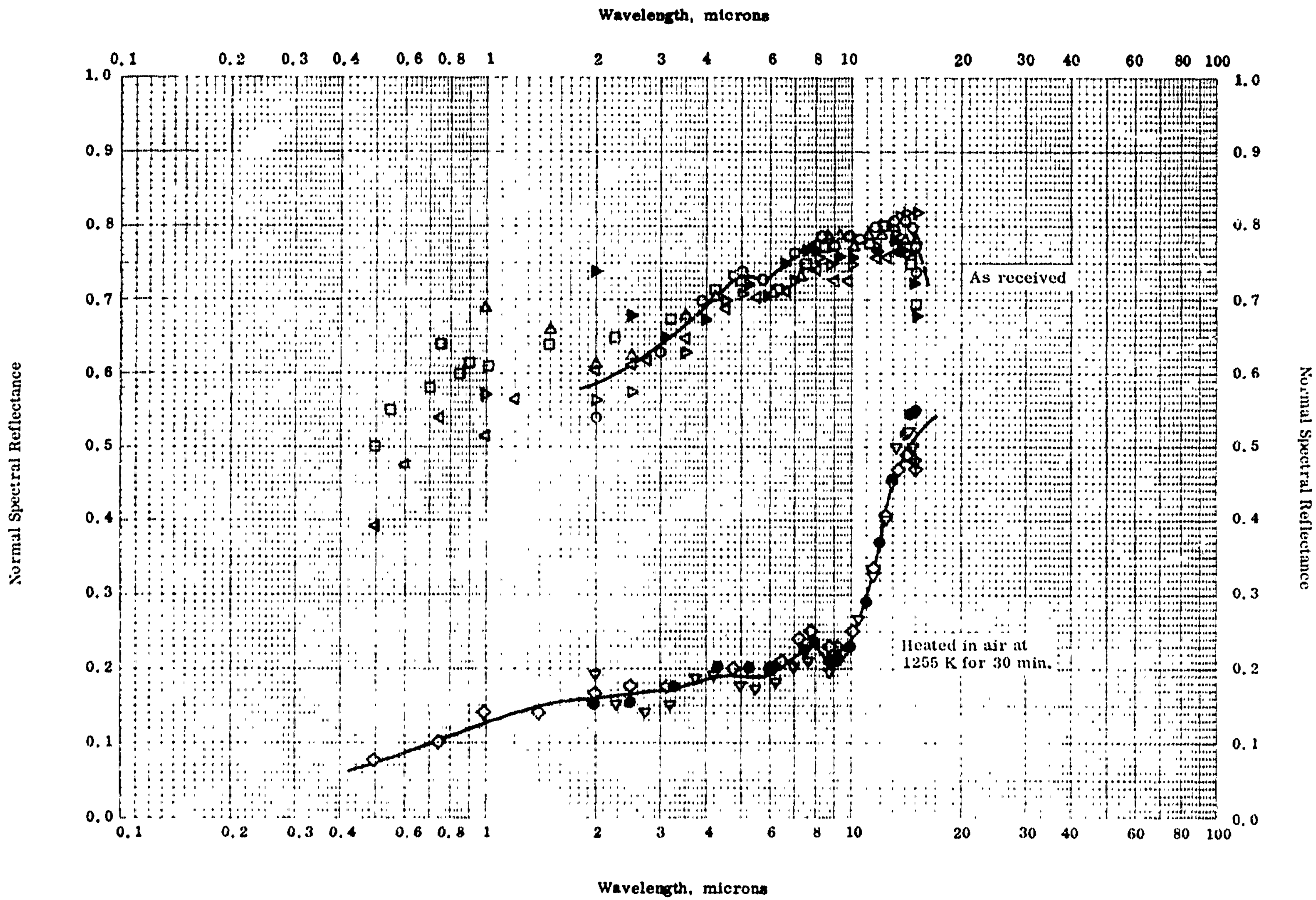


NORMAL SPECTRAL EMITTANCE -- NICKEL + COBALT + ΣX$_i$
(Astroloy)

NORMAL SPECTRAL EMITTANCE -- NICKEL + COBALT + ΣX_i
(Astroloy)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	523	2.0-15.00		Commercial Astroloy; nominal: 56.8 Ni, 15 Co, 5.25 Mo, 5 Cr, 4.4 Al and 3.5 Ti, 0.06 C.	As received.
△	62-19	773	1.50-15.00		Same as above.	Same as above; different specimen.
□	62-19	1023	1.0-15.00		Same as above.	Same as above; different specimen.
▼	62-19	523	2.00-15.00		Same as above.	Heated in air at 1255 K for 20 min.
●	62-19	773	1.00-15.00		Same as above.	Same as above; different specimen.
◇	62-19	1023	1.00-15.00		Same as above.	Same as above; different specimen.
▷	62-19	523	2.00-15.00		Same as above.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.
▽	62-19	773	1.00-15.00		Same as above.	Same as above; different specimen.
◀	62-19	1023	1.00-15.00		Same as above.	Same as above; different specimen.

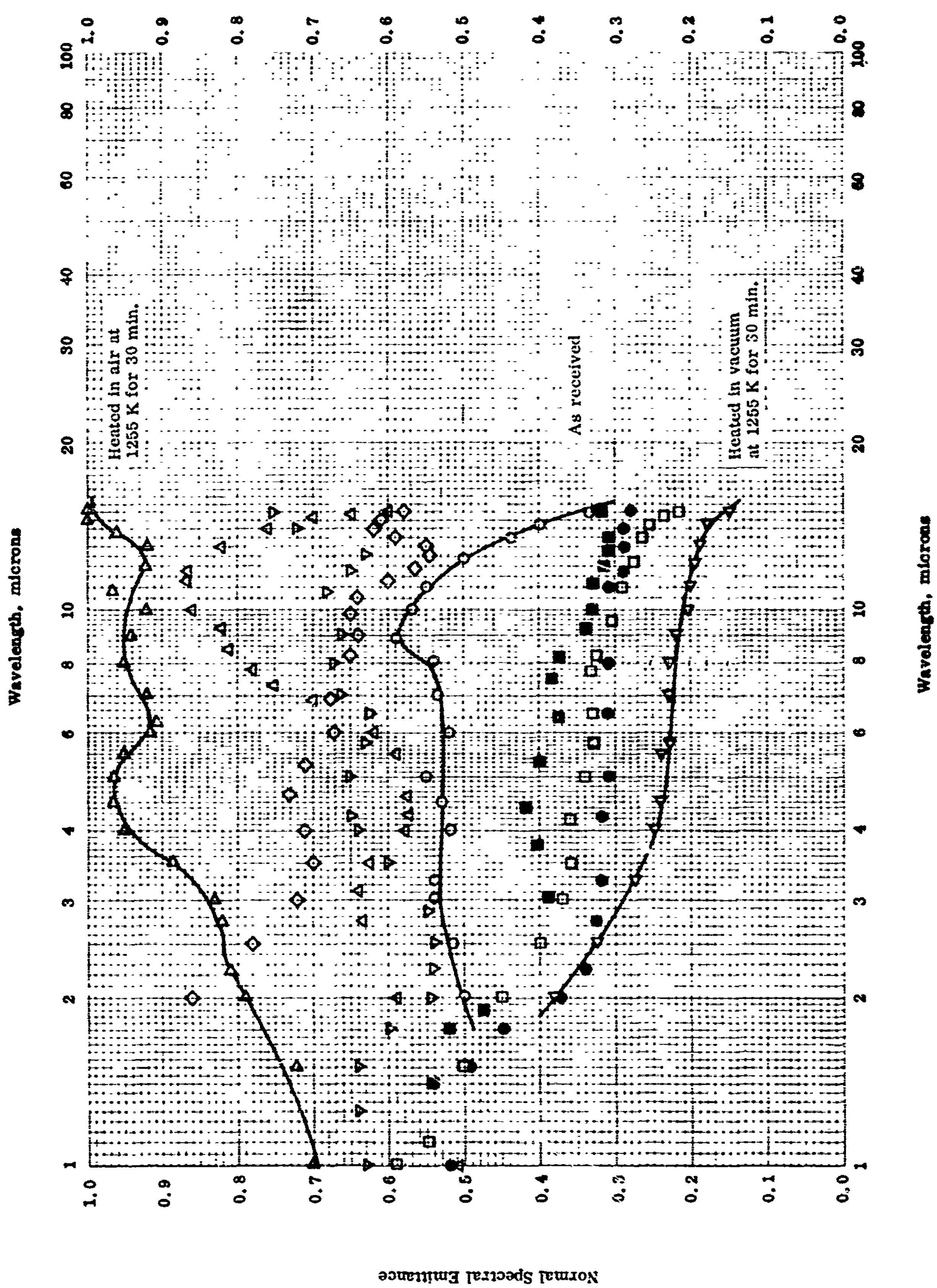


NORMAL SPECTRAL REFLECTANCE -- NICKEL + COBALT + ΣX_i
(Astroloy)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + COBALT + ΣX_i
(Astrolloy)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	< 322	2.00-15.00		Astrolloy, nominal: 56.8 Ni, 15 Co, 5.25 Mo, 5 Cr, 4.4 Al, 3.5 Ti and 0.06 C.	As received; 523.2 K source.
△	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
□	62-19	< 322	0.5 -15.00		Same as above.	The above specimen with 1273 K source.
▽	62-19	< 322	2.00-15.00		Commercial astrolloy.	Heated in air at 1255 K for 30 min.; 523.2 K source.
●	62-19	< 322	2.00-15.00		Same as above.	The above specimen with 773.2 K source.
◇	62-19	< 322	0.5 -15.00		Same as above.	The above specimen with 1273 K source.
▶	62-19	< 322	2.00-15.00		Commercial astrolloy.	Heated in a 7.6 x 10^{-5} mm Hg vacuum at 1255 K for 30 min.; 523.2 K source.
▷	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
◁	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.

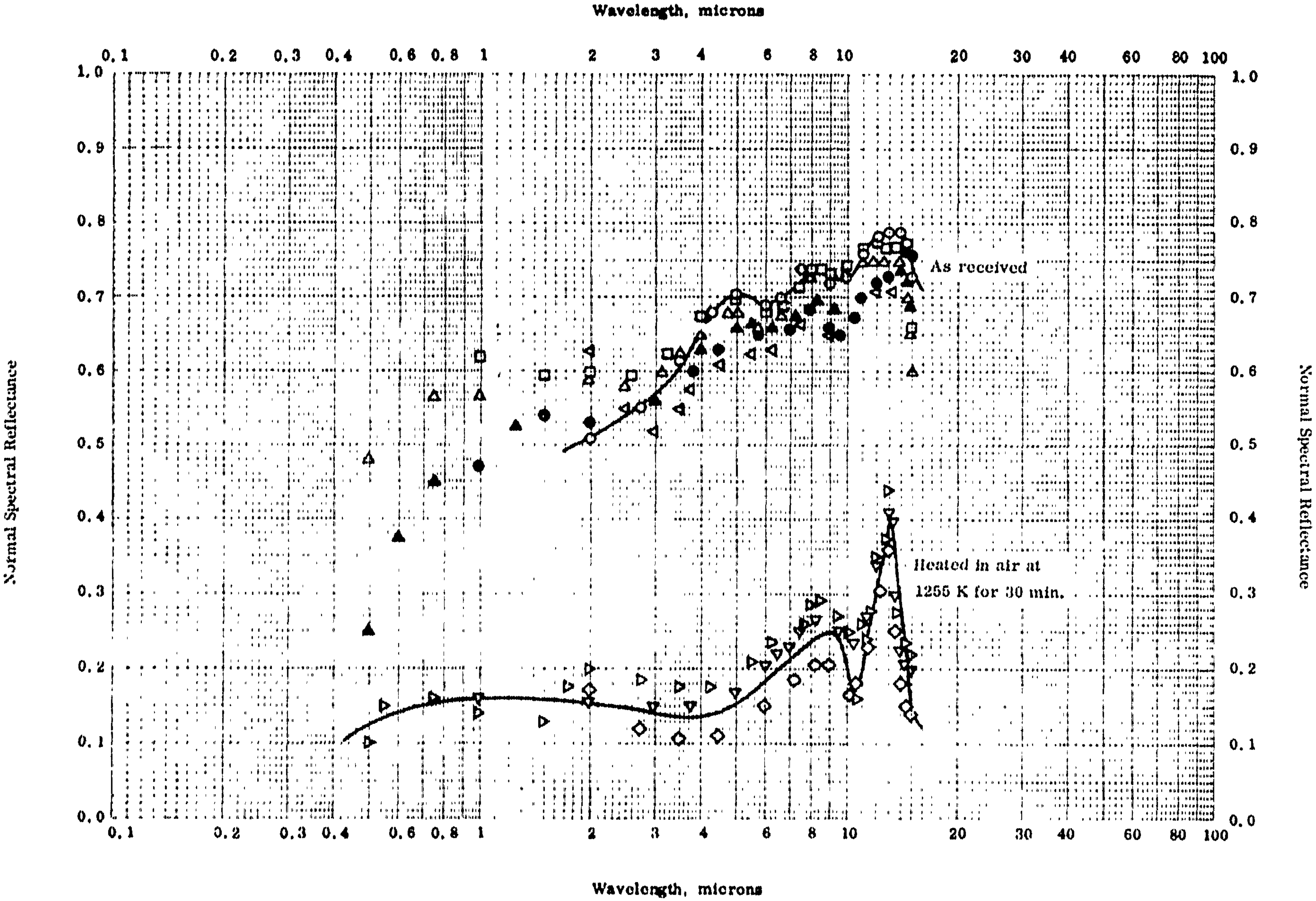


NORMAL SPECTRAL EMITTANCE -- NICKEL + COBALT + ΣX_i
(Udimet 500)

NORMAL SPECTRAL EMITTANCE - - NICKEL + COBALT + ΣX_i
(Udimet 500)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	62-19	523	2.00-15.00		Commercial Udimet 500, nominal: 44.1 Ni, 20 Co, 20 Cr, 5 Mo, 4 Fe, 3.25 Ti, 2.5 Al, 0.75 Mn, 0.75 Si, 0.15 C and 0.01 B.	As received.
□	62-19	773	1.00-15.00		Same as above.	Same as above; different specimen.
△	62-19	1023	1.00-15.00		Same as above.	Same as above; different specimen.
◇	62-19	523	2.00-15.00		Commercial Udimet 500.	Heated in air at 1255 K for 30 min.
▽	62-19	773	1.00-15.00		Same as above.	Same as above; different specimen.
▷	62-19	1023	1.00-15.00		Same as above.	Same as above; different specimen.
◁	62-19	523	2.00-15.00		Commercial Udimet 500.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.
●	62-19	773	1.00-15.00		Same as above.	Same as above; different specimen.
■	62-19	1023	1.00-15.00		Same as above.	Same as above; different specimen.



NORMAL SPECTRAL REFLECTANCE -- NICKEL + COBALT + ΣX_i
(Udimet 500)

NORMAL SPECTRAL REFLECTANCE -- NICKEL + COBALT + ΣX_i
(Udimet 500)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error%	Sample Specifications	Remarks
○	62-19	< 322	2.00-15.00		Commercial Udimet 500, nominal: 44.1 Ni, 20 Co, 20 Cr, 5 Mo, 4 Fe, 3.25 Ti, 2.5 Al, 0.75 Mn, 0.75 Si, 0.15 C and 0.01 B.	As received; 523.2 K source.
□	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
△	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.
◇	62-19	< 322	2.00-15.00		Commercial Udimet 500.	Heated in air at 1255 K for 30 min.; 523.2 K source.
▽	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▷	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273.2 K source.
◁	62-19	< 322	2.00-15.00		Commercial Udimet 500.	Heated in a 7.6×10^{-5} mm Hg vacuum at 1255 K for 30 min.; 523.2 K source.
●	62-19	< 322	1.00-15.00		Same as above.	The above specimen with 773.2 K source.
▲	62-19	< 322	0.50-15.00		Same as above.	The above specimen with 1273 K source.

PROPERTIES OF NICKEL + COPPER + ΣX_i

REPORTED VALUES

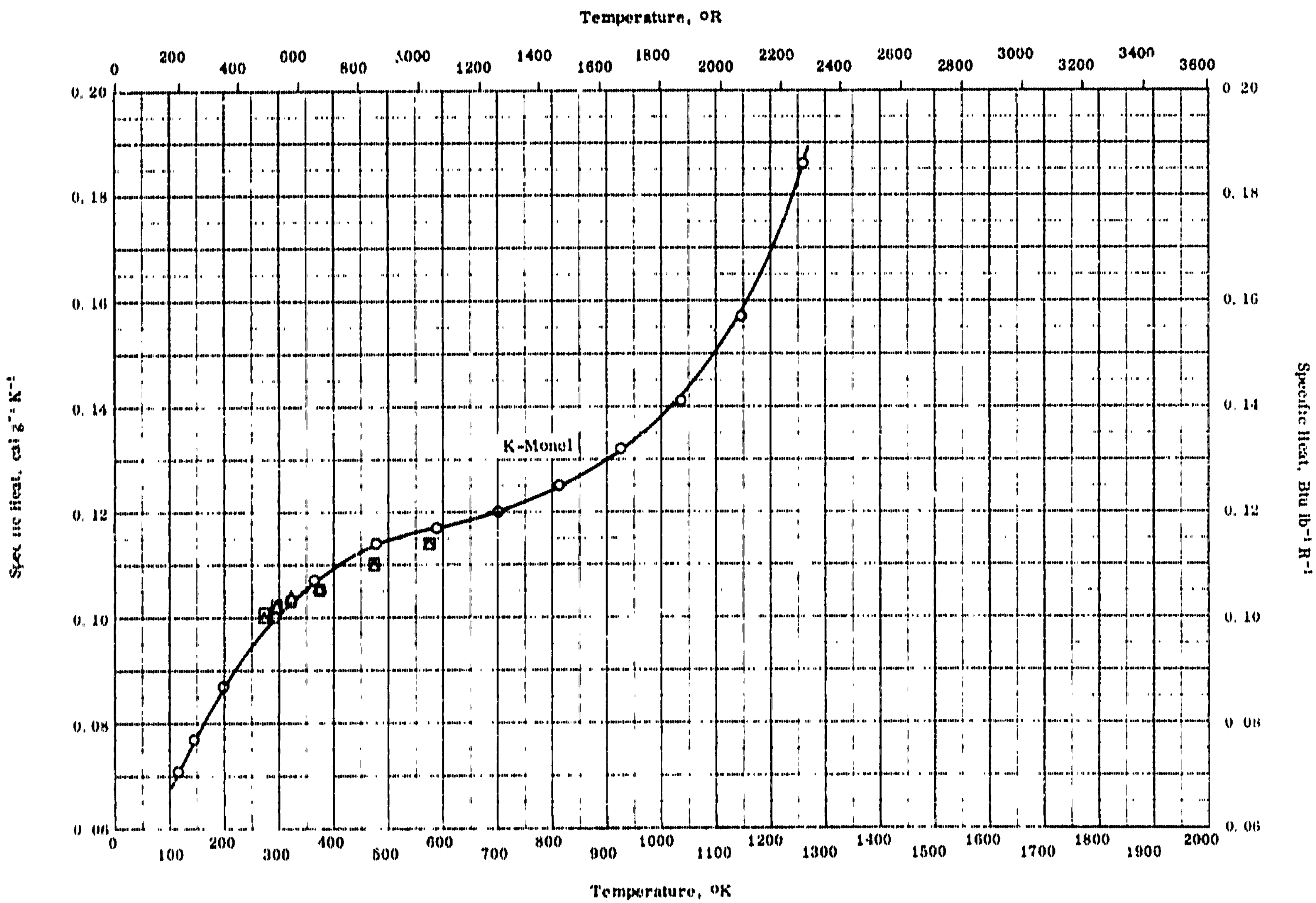
Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
○ K-Monel	8.456*	527.9*
□ K-Monel	8.46	528

* Most probable value for alloys of this composition.

PROPERTIES OF NICKEL + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	293		K-Monel; nominal composition: 66 Ni, 30 Cu, and 3 Al.	Hot-rolled, annealed 1 hr at 900 C, and water-quenched.
□	51-6	293		K-Monel; 65.51 Ni, 29.23 Cu, 3.02 Al, 0.86 Fe, 0.60 Mn, 0.13 C, 0.09 Si, and 0.005 S.	Same as above.

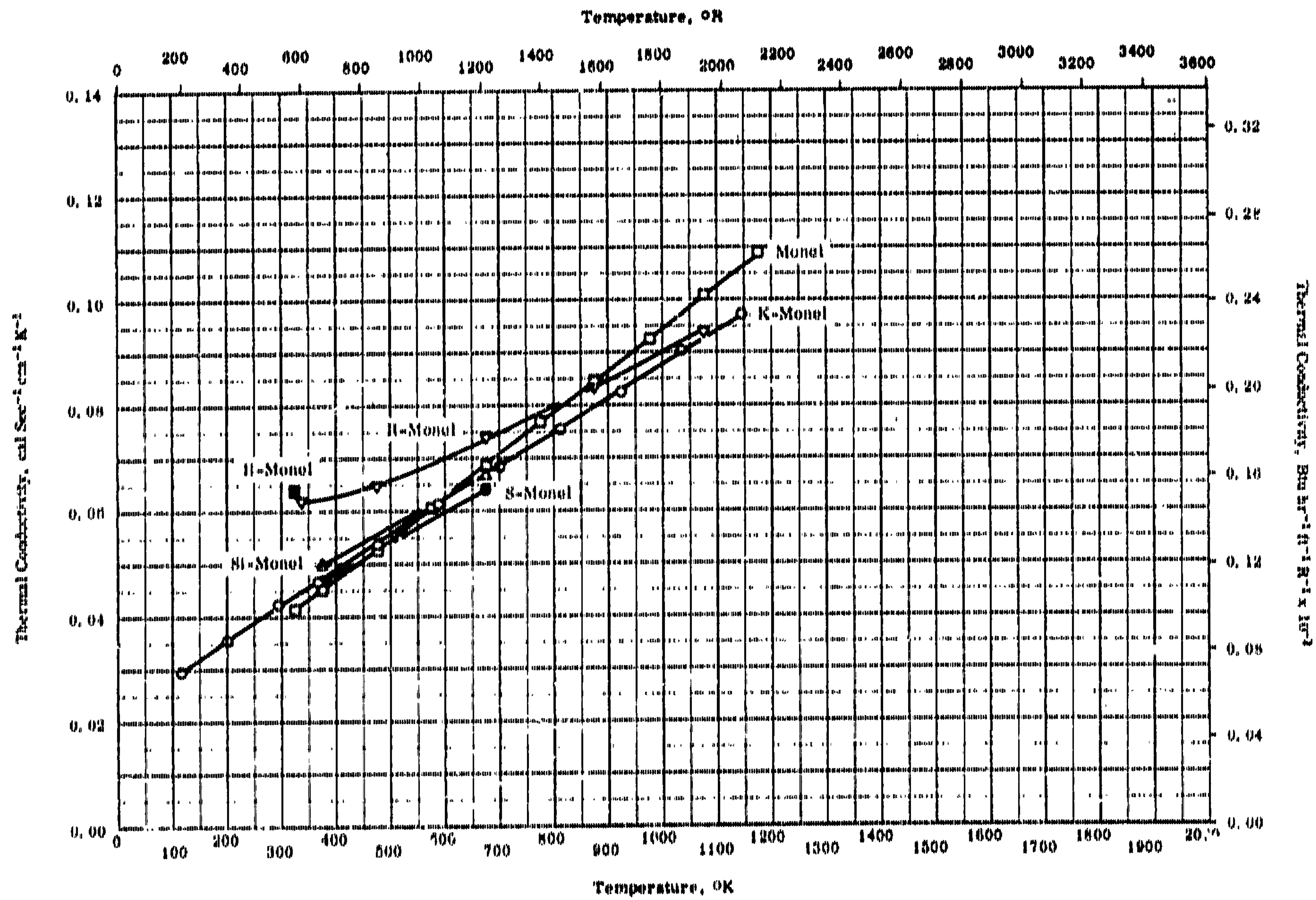


SPECIFIC HEAT — NICKEL + COPPER + ΣX_i

SPECIFIC HEAT -- NICKEL + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	116-1255		K-Monel, nominal composition 66 Ni, 29 Cu, and 3 Al; density 527 lb ft^{-3} at 32 F.	Annealed 1 hr at 1050 F and water quenched.
□	61-16	273-573	± 0.3	Monel; 66.9 Ni, 29.8 Cu, 1.6 Fe, 1.0 Mn, 0.15 C, and 0.07 Si.	
△	53-12 also 55-16	273-573	± 2.0	Monel, 67.1 Ni, 29.3 Cu, 1.8 Fe, 1.0 Mn, 0.18 C, and 0.07 Si.	

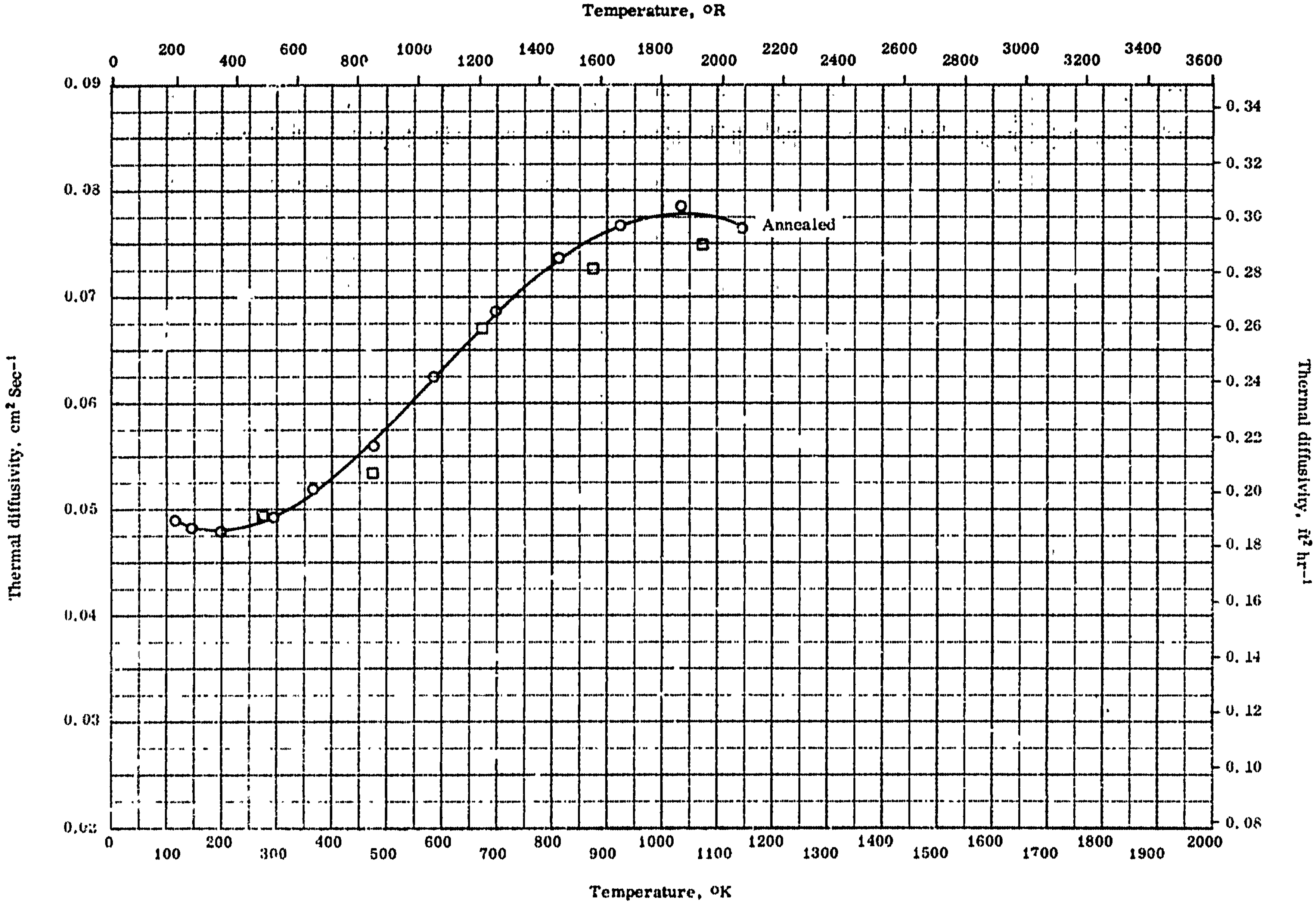


THERMAL CONDUCTIVITY -- NICKEL + COPPER + ΣXi

THERMAL CONDUCTIVITY -- NICKEL + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-6	117-1145		K-Monel; 65.51 Ni, 29.23 Cu, 3.02 Al, 0.86 Fe, 0.60 Mn, 0.13 C, 0.09 Si, and 0.005 S; density 528 lb ft^{-3}.	Hot-rolled; annealed 1 hr at 1650 F and water-quenched.
□	53-2	323-1173		Monel; 66.2 Ni, 30 Cu, 1.88 Fe, 0.919 Mn, 0.407 Co, 0.40 C, 0.135 Si, and 0.032 Mg.	
△	39-1	373-673	2.0	Si Monel; 65.39 Ni, 28.71 Cu, 2.09 Si, 1.86 Fe, 1.54 Mn, and 0.41 C.	Cast.
▽	53-8	337-1373		R-Monel; 67.0 Ni, 30.0 Cu, 1.40 Fe, 1.0 Mn, 0.15 C, 0.05 Si, 0.035 S; nominal composition.	
●	54-3	373-673		S Monel; 62-66 Ni, 30.25-31.75 Cu, 3.5-5.0 Si, 3.5 >Fe, 0.5-1.5 Mn, and 0.25 C; nominal composition.	
■	56-8	323		H Monel; 61-68 Ni, 23.95-32.95 Cu, 2.7-3.7 Si, 2.5 Fe, 0.5-1.5 Mn, 0.3 C, and 0.05 S.	Cast.



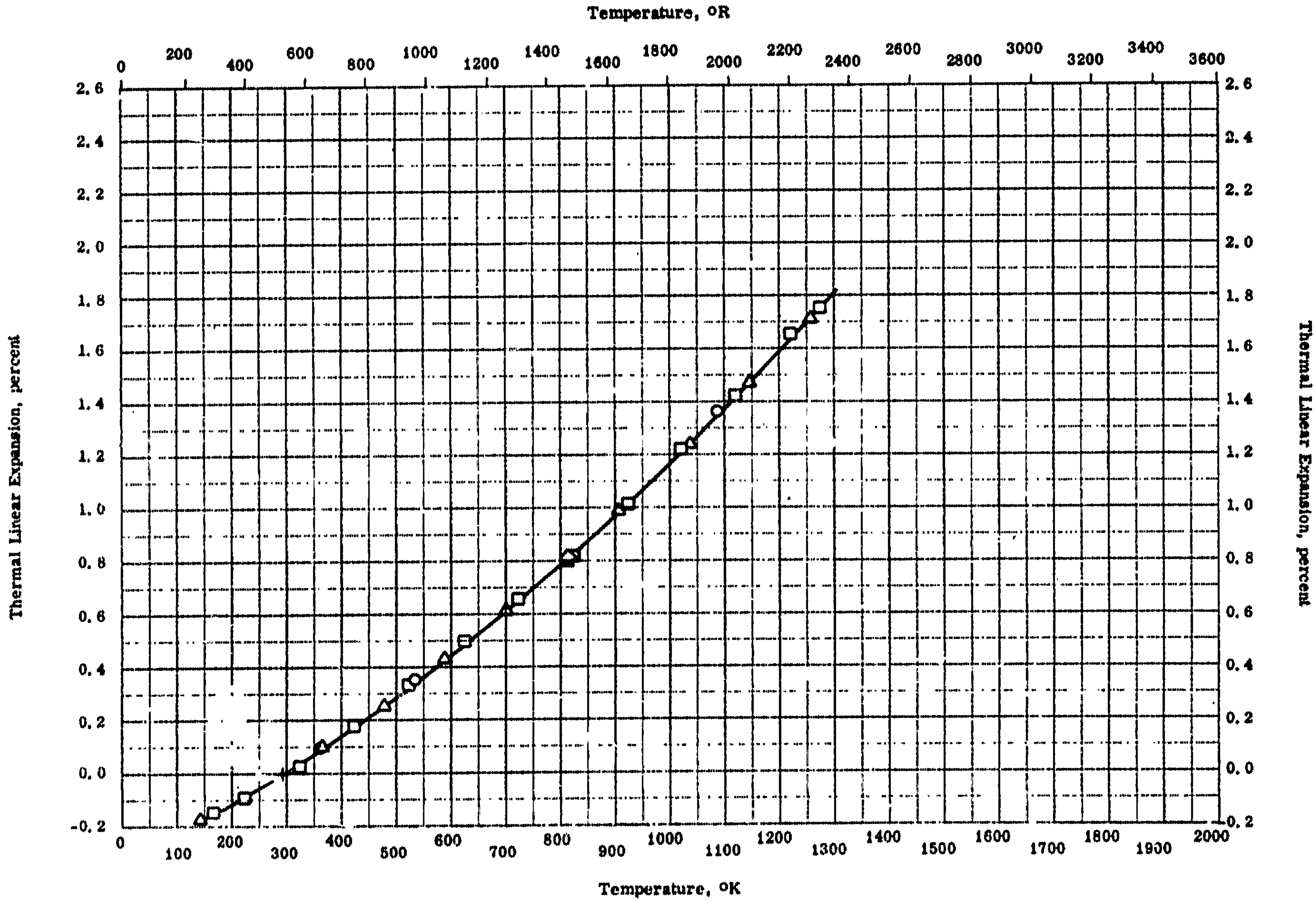
THERMAL DIFFUSIVITY -- NICKEL + COPPER + ΣX_i
(K-monels)

THERMAL DIFFUSIVITY -- NICKEL + COPPER + ΣX_i
(K-monels)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-1	116-1144		K-monel; 65.51 Ni, 29.23 Cu, 3.02 Al, 0.86 Fe, 0.60 Mn, 0.13 C, 0.09 Si, and 0.005 S.	Hot rolled; annealed at 1650 F for 1 hr and water quenched.
□	56-1	273-1073		K-monel; 66 Ni, 29 Cu, 3 Al, and 2.0 others; nominal composition from Metal's Handbook.	

Temperature, °R

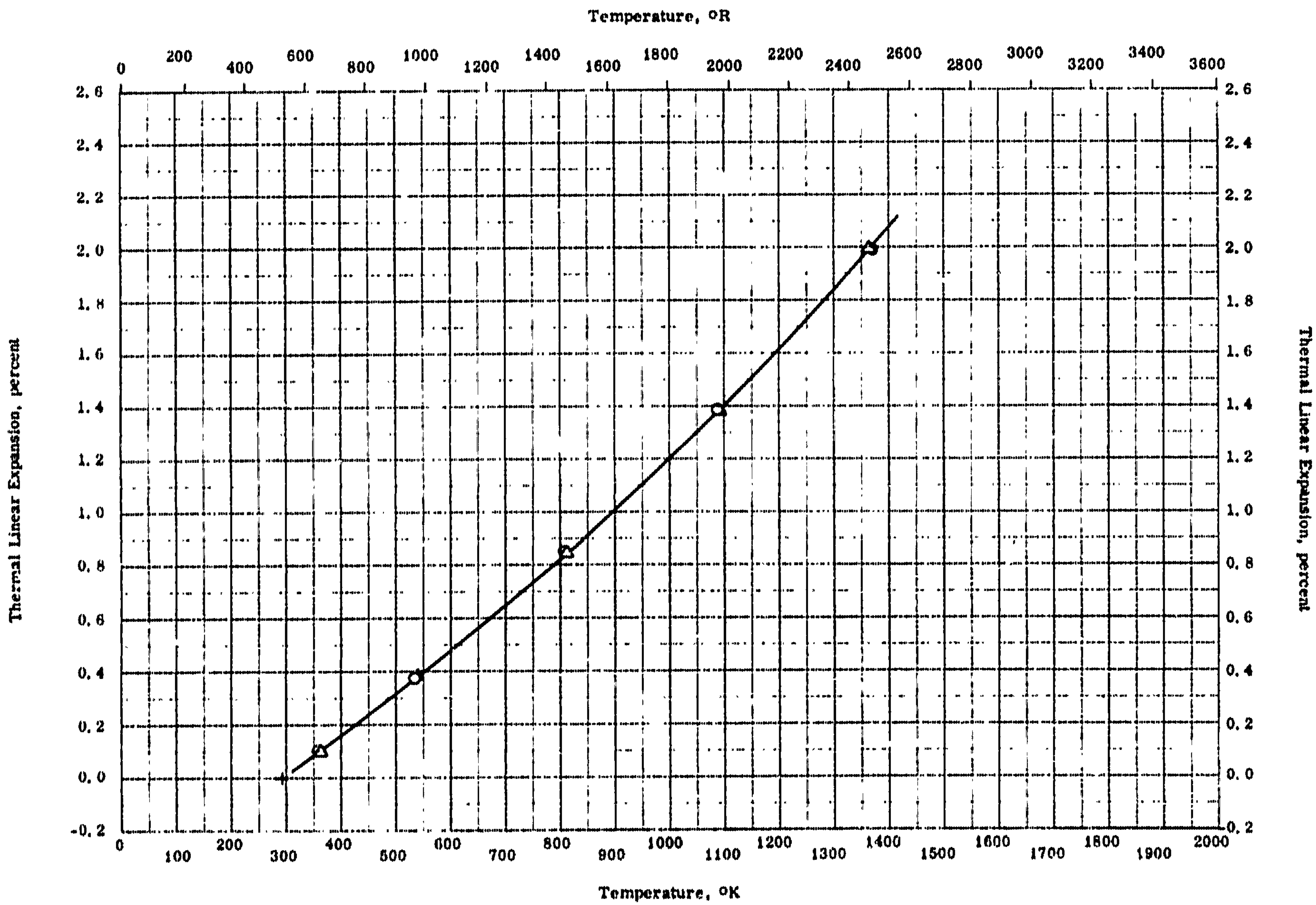


THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_1
(29 - 30 Cu and 2.8 - 3.5 Al)

THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(29 - 30 Cu and 2.8 - 3.5 Al)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	51-6	83-1274		K Monel; 65.51 Ni, 29.23 Cu, 3.02 Al, 0.86 Fe, 0.60 Mn, 0.13 C, 0.09 Si, and 0.005 S; density 528 lb ft^{-3}.	Hot rolled, annealed 1 hr at 1650 F, and water quenched; tested at 1.5 - 2.5 C min^{-1} heating rate in argon.
△	58-1	117-1256		K-Monel; nominal: 66 Ni, 30 Cu, 3.5 Al, 1.5 Fe, 0.20 max C, and < 5 others.	Hot rolled, annealed 1 hr at 1650 F, and water quenched; tested in vacuum.
○	65-4	294-1089		Monel K-500, formerly "K-Monel" from International Nickel Co.; nominal: 65.0 Ni, 29.5 Cu, 2.80 Al, 1.00 Fe, 0.60 Mn, 0.50 Ti, 0.15 C, 0.15 Si, and 0.005 S; density 0.306 lb $in.^{-3}$ and M.P. 2400 - 2460 F.	
◇	65-4	294-1089		Monel 501, formerly "KR-Monel" from International Nickel Co.; nominal: 65.0 Ni, 29.5 Cu, 2.80 Al, 1.00 Fe, 0.60 Mn, 0.50 Ti, 0.23 C, 0.15 Si, and 0.005 S; density 0.306 lb $in.^{-3}$ and M.P. 2400 - 2460 F.	



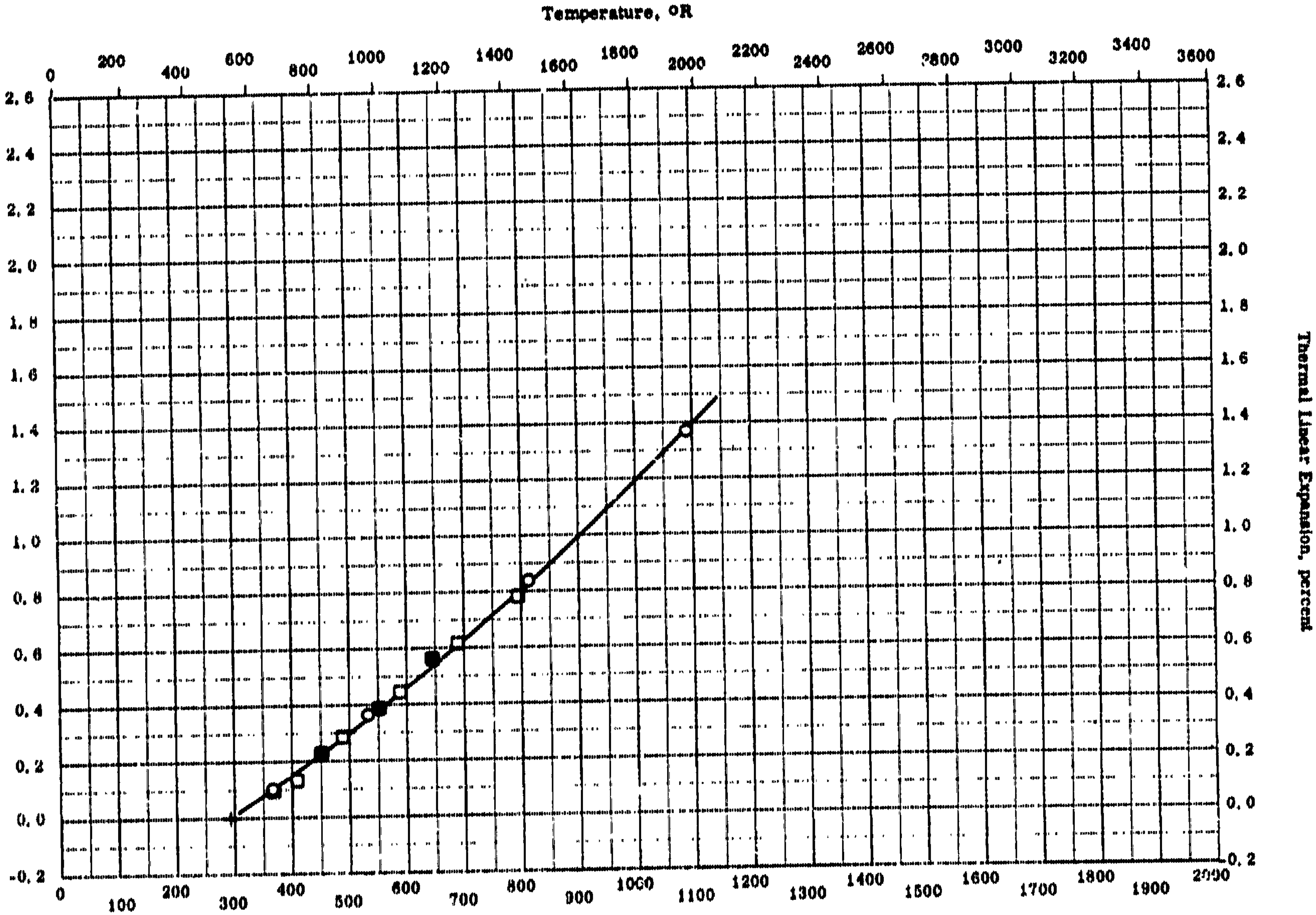
THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(31.5 Cu and 1.35 Fe)

THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(31.5 Cu and 1.35 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	65-4	294-1366		Monel 400; formerly "Monel" from International Nickel Co.; nominal: 66.0 Ni, 31.5 Cu, 1.35 Fe, 0.90 Mn, 0.15 Si, 0.12 C, and 0.005 S; density 0.319 lb in.$^{-3}$ and M.P. 2370 - 2460 F.	
○	65-4	294-1366		Monel R-405; formerly "R-Monel" from International Nickel Co.; nominal: 66.0 Ni 31.5 Cu, 1.35 Fe, 0.90 Mn, 0.18 C, 0.15 Si, and 0.005 S; density 0.319 lb in.$^{-3}$ and M.P. 2370 - 2460 F.	

Temperature, °R

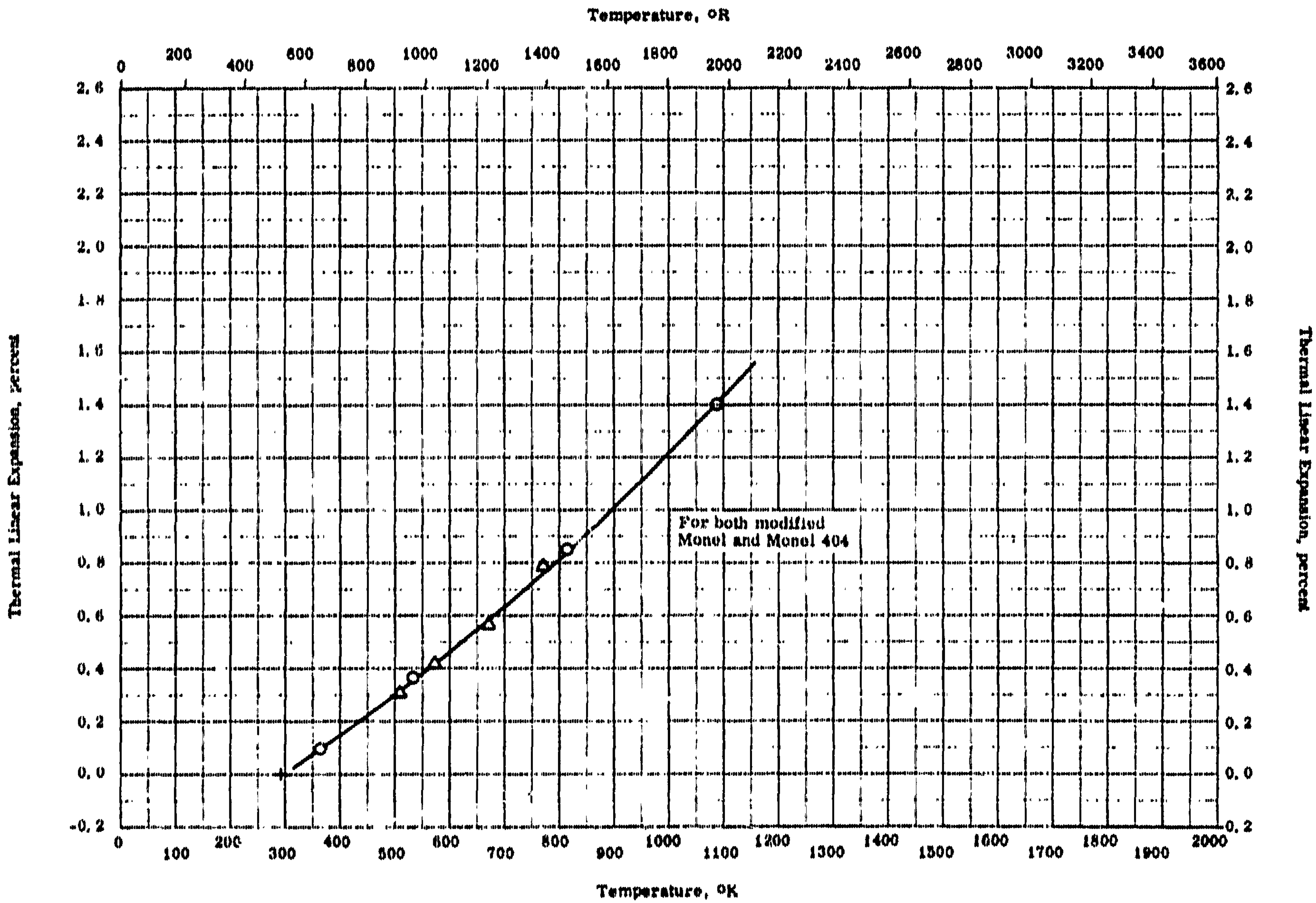


THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(26 - 40 Cu and 1.8 - 2 Mn)

THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(26 - 40 Cu and 1.8 - 2 Mn)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	57-52	293-792		Monel; 66.2 - 67.6 Ni, 26.7 - 29.3 Cu, 2.00 Mn, 1.70 Fe, 0.24 C, and 0.00 S.	Hot rolled; average of 4 samples within range of ± 1 %; heating.
■	57-52	369-792		Same as above.	Cooling data of a[illegible]ve specimens.
○	65-4	294-1080		Monel 403; International Nickel Co.; nominal: 57.5 Ni, 40.0 Cu, 1.80 Mn, 0.50 Fe, 0.25 Si, 0.12 C, and 0.005 S; density 0.320 lb in.$^{-3}$	

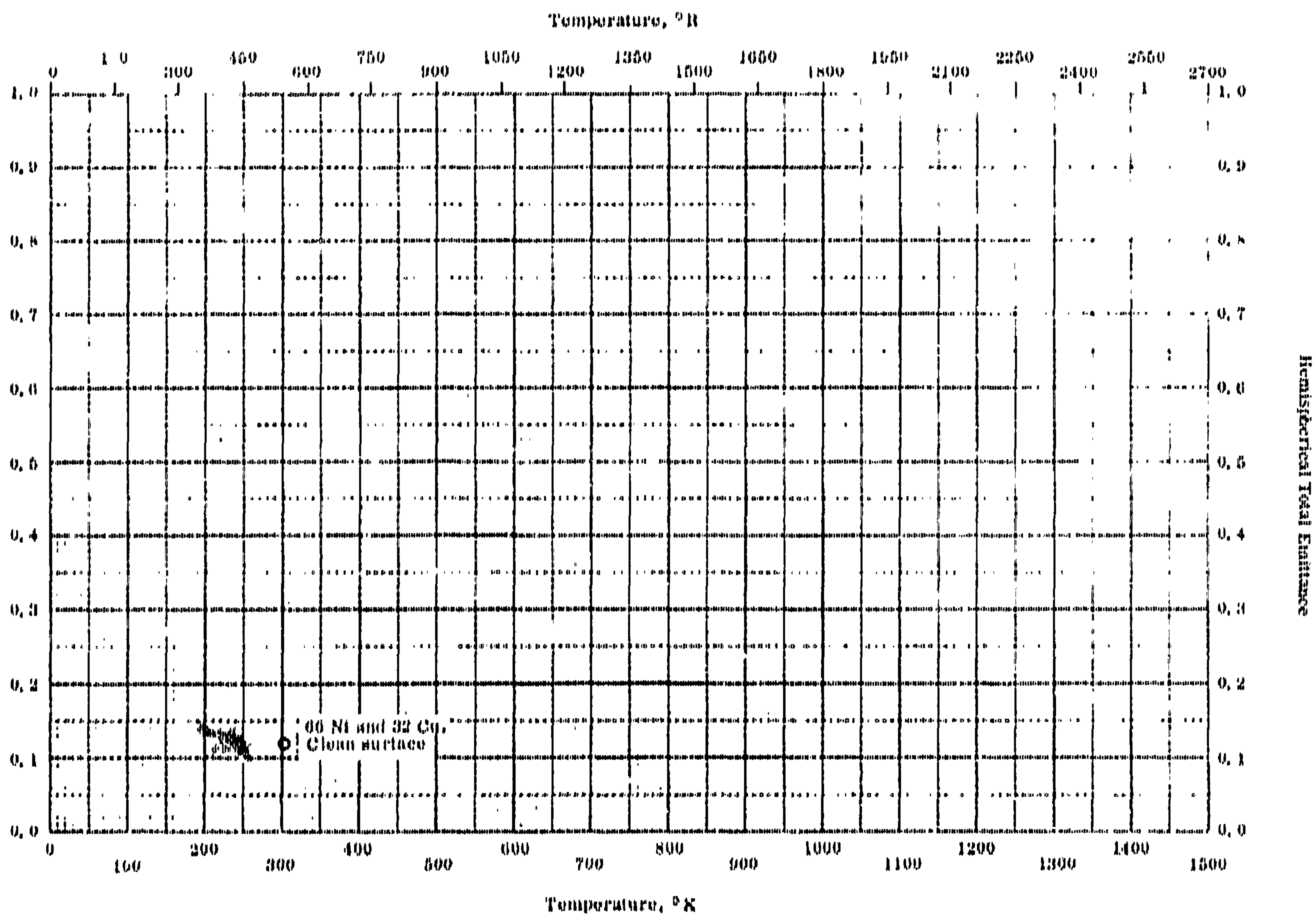


THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX$_i$
(Miscellaneous)

THERMAL LINEAR EXPANSION -- NICKEL + COPPER + ΣX_i
(Miscellaneous)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	57-62	293-770		Modified Monel; 61.) Ni, 25 Cu, 9.0 Sn, 3.5 Fe, and 0.75 Mn, Si each.	Cast in sand mold; average of heating and cooling range of ± 1%.
○	65-4	294-1089		Monel 404; International Nickel Co.; nominal: 55.0 Ni, 44.0 Cu, 0.00 C, 0.05 Fe, 0.02 Al, 0.02 Si, 0.01 Mn, and 0.006 S; density 0.321 lb in.$^{-3}$	

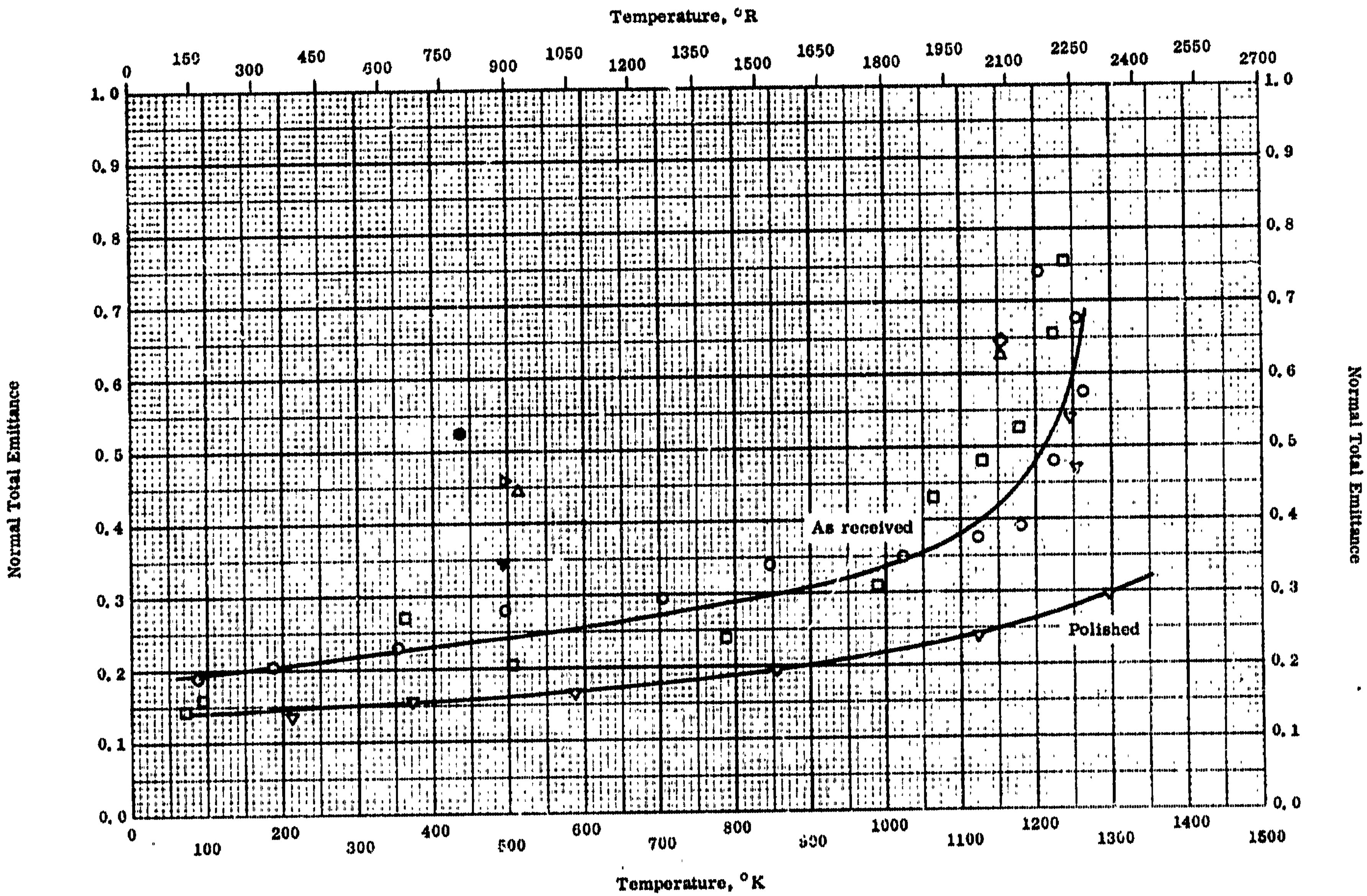


HEMISPHERICAL TOTAL EMITTANCE -- NICKEL + COPPER + ΣXᵢ

HEMISPHERICAL TOTAL EMITTANCE -- NICKEL + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	48-7	304		Monel; nominal: 66.0 Ni, 31.5 Cu, 1.35 Fe, 0.90 Mn, 0.15 Si, 0.12 C, and 0.005 S.	Clean surface; measured in air.

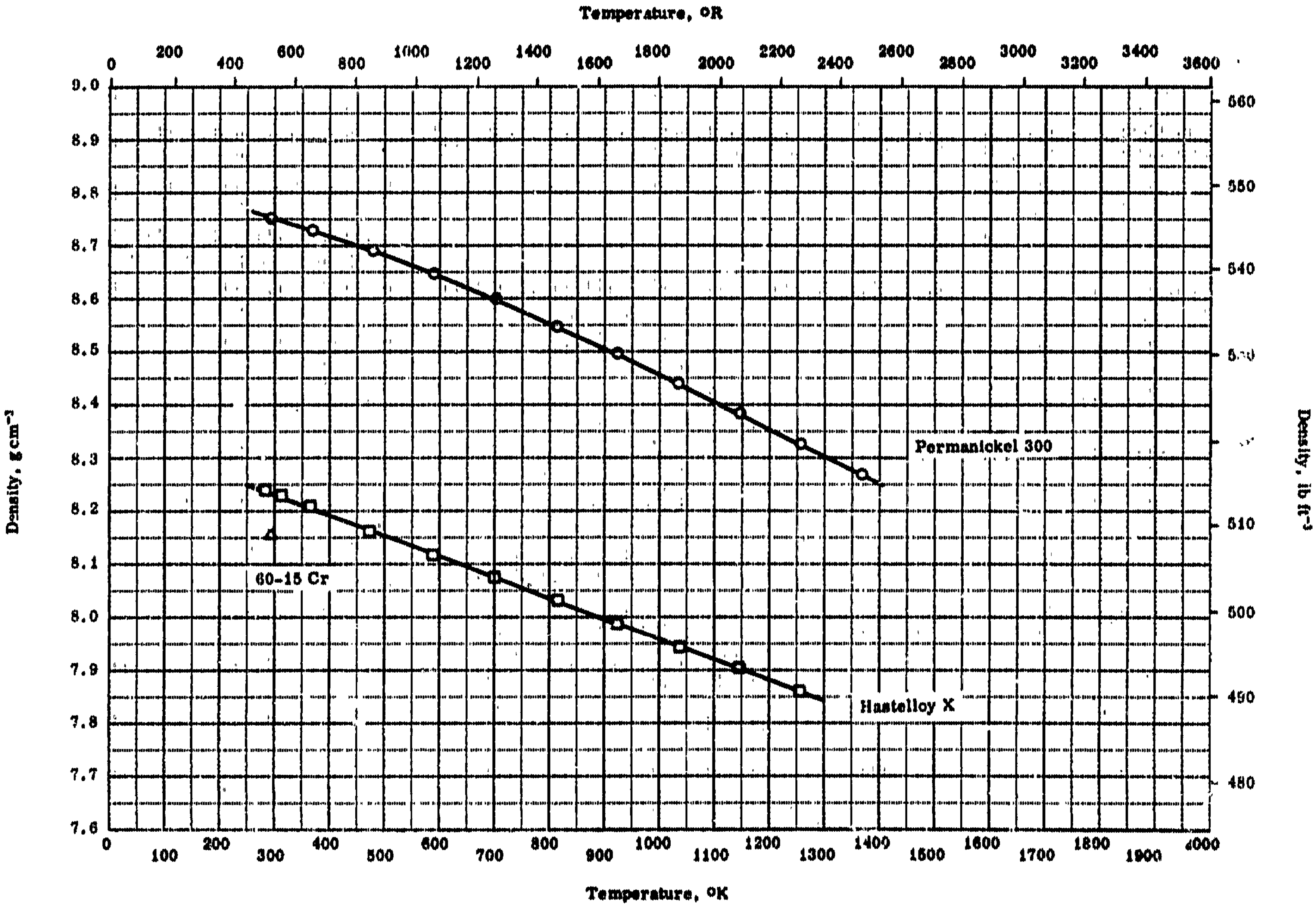


NORMAL TOTAL EMITTANCE -- NICKEL + COPPER + ΣX_i
(K Monel 5700)

NORMAL TOTAL EMITTANCE -- NICKEL + COPPER + ΣX_i
(K Monel 5700)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-27	89-1205		K Monel 5700, nominal: 66 Ni, 30 Cu, and 3 Al.	As received; wiped; measured in helium (10 microns pressure); cycle 1 heating.
△	54-27	514-1156		Same as above.	The above specimen; cycle 1 cooling.
◇	54-27	1156		Same as above.	The above specimen; cycle 2 heating.
▷	54-27	497		Same as above.	The above specimen; cycle 2 cooling.
□	54-27	72-1239		K Monel 5700.	Scrubbed, washed and wiped; measured in helium (10 microns pressure); cycle 1 heating.
●	54-27	439		Same as above.	The above specimen; cycle 2 cooling.
▽	54-27	72-1247		K Monel 5700.	Polished to a mirror like finish, washed; measured in helium (10 microns pressure); cycle 1 heating.
▼	54-27	497		Same as above.	The above specimen; cycle 3 cooling.

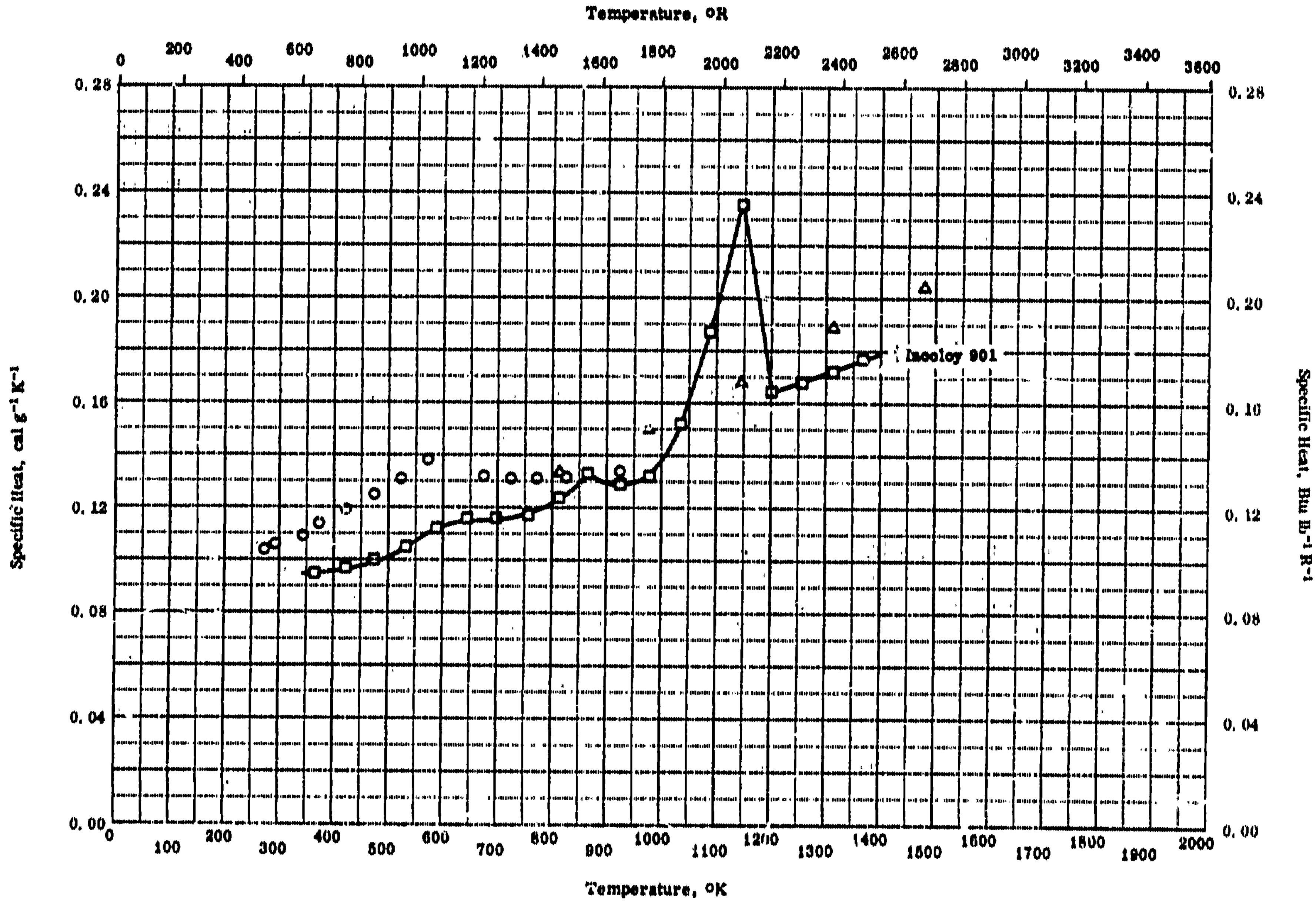


DENSITY -- NICKEL + IRON + ΣX_i

DENSITY -- NICKEL + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	58-2	298		60-15 Cr (ASTM B83-46); 57.7 Ni, 23.92 Fe, 15.73 Cr, 1.14 Si, 0.052 C, and 0.04 Mo.	
□	61-4	283-1255		45 Ni, 23.85 Fe, 22 Cr, 9 Mo, and 0.15 C.	
○	62-17	294-1307		Permanickel 300.	

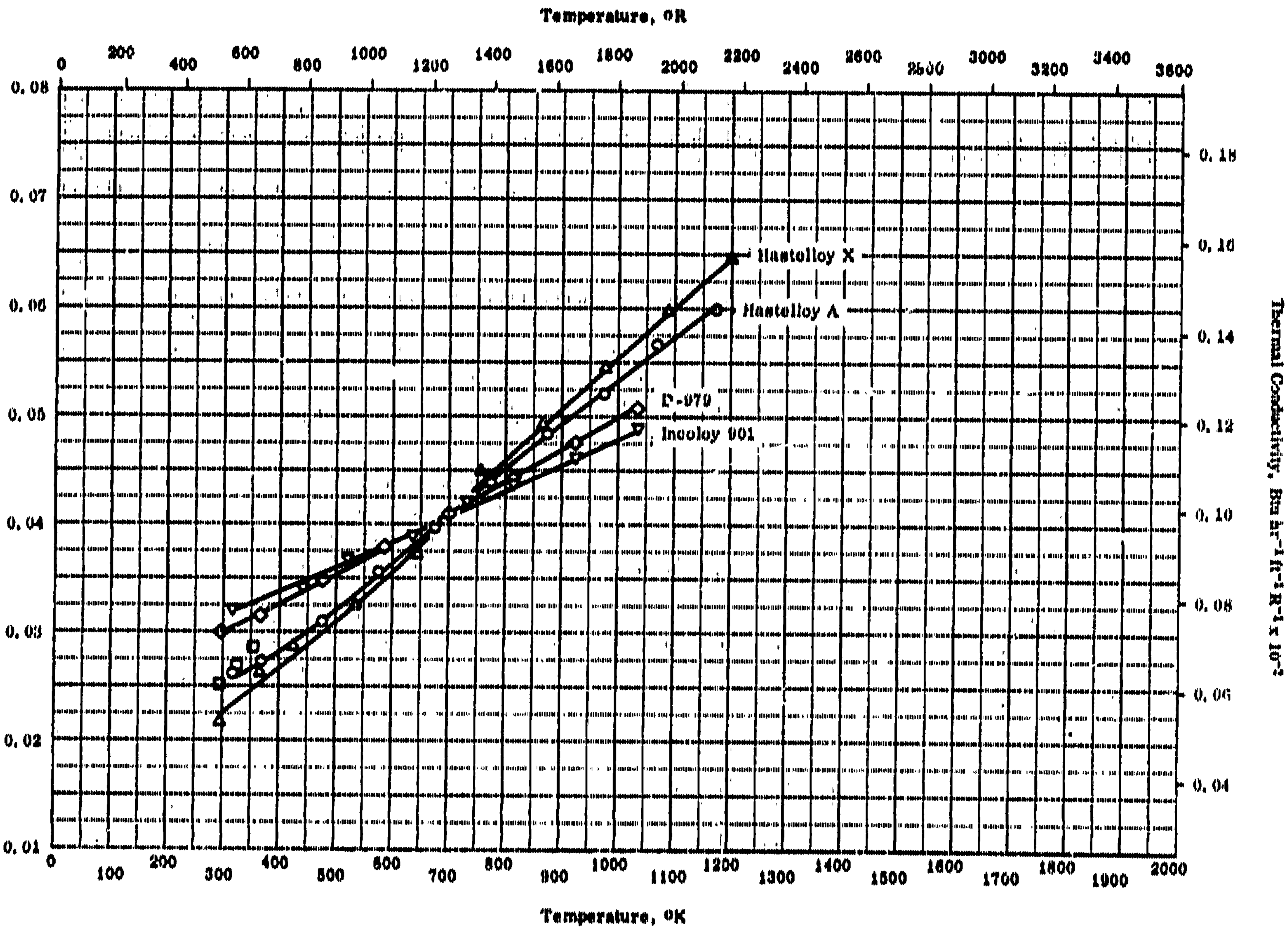


SPECIFIC HEAT -- NICKEL + IRON + ΣX_i

SPECIFIC HEAT -- NICKEL + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-18	273-923		98.7 Ni, 0.30 Fe, 0. ' Mn, 0.20 Cu, 0.18 Mg, 0.17 C, 0.14 SiO_2, and 0.04 S.	Cast; rolled at 1150 C, annealed at 900 C, cold drawn and then annealed at 700 C.
□	59-14	366-1366	5-10	Incoloy 901; 40.0 Ni, 35.0 Fe, 13.0 Cr, 6.0 Mo, 2.4 Ti and 0.05 C.	Heated 2 hrs at 2050 F and oil quenched and then heated 24 hrs at 1375 and air cooled.
△	58-2	805-1185	3.0	60-15 Cr (ASTM B83-46); composition before test; 57.70 Ni, 23.92 Fe, 15.73 Cr, 1.14 Si, 0.062 C, 0.03 Mo, and after test; 57.70 Ni, ·̃.91 Fe, 15.80 Cr, 1.33 Si, 0.050 C, and 0.03 Mo; density 508.9 lb ft^{-3}.	

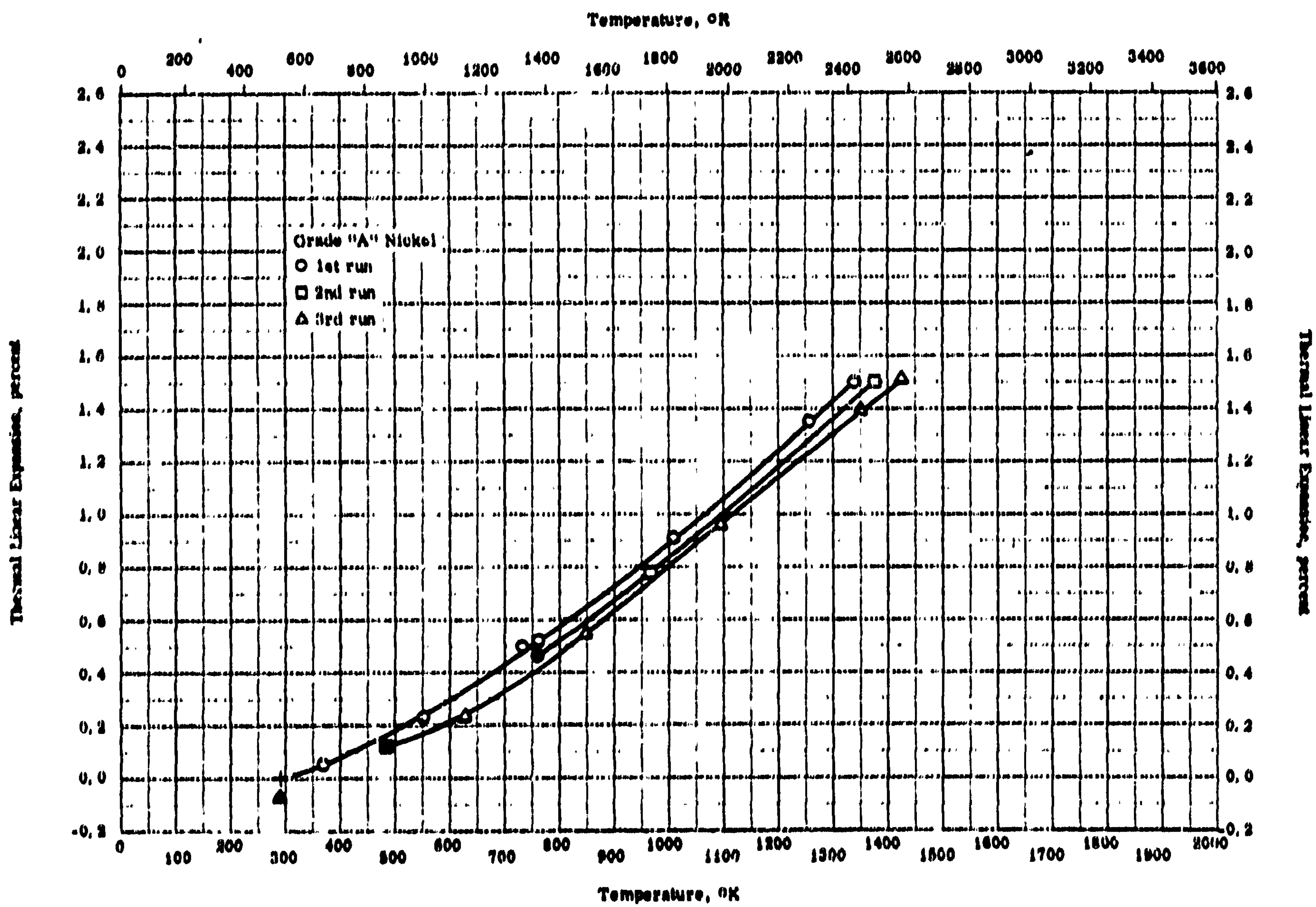


THERMAL CONDUCTIVITY -- NICKEL + IRON + ΣX$_i$

THERMAL CONDUCTIVITY -- NICKEL + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-2	319-1173	2	Hastelloy A; 57.1 Ni, 21.4 Fe, 19.0 Mo, 2.5 Mn, and 0.072 C.	Annealed at 1150 C.
□	58-3	293-353	1	Contracid; 59.17 Ni, 23.16 Fe, 14.92 Cr, 2.02 Mn, 0.73 Mo, and trace Si.	
△	61-4	294-1200		Hastelloy X; 45 Ni, 23.86 Fe, 22 Cr, 9 Mo, and 0.15 C.	
▽	60-9	316-1033		Incoloy 901; 42 Ni, 38 Fe, 12 Cr, 6 Mo, and 2.5 Ti; density 0.297 lb in^{-3}.	
◇	59-8	297-1033		D-979; 27 Fe, 15 Cr, 3.75 Mo, 3.75 W, 3 Ti, 1 Al, 0.5 Mn, 0.5 Si, 0.05 C, and 0.01 B; density 0.295 lb in^{-3}.	

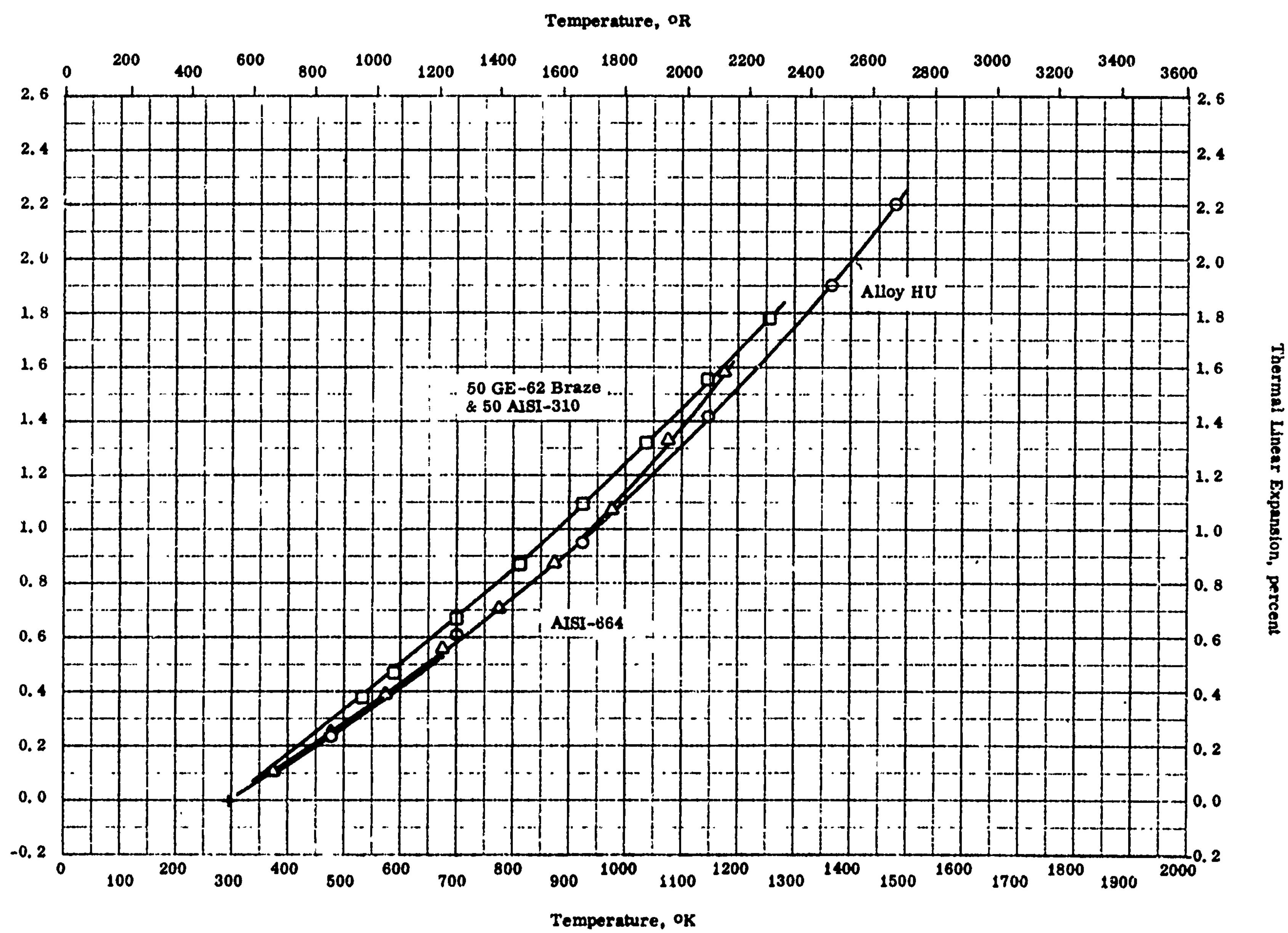


THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
($Fe < 1.0$)

THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
(Fe < 1.0)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-24	294-1339	2	Grade "A"; J.M. Tully Metal and Supply Co.; 98.18 Ni, 0.5 Fe, 0.5 Si, 0.35 Mn, 0.25 Cu, 0.2 C, and 0.02 S; density 546 lb ft^{-3} by vol displacement.	Cold rolled from melt; measured in helium; heating.
●	62-24	760-1339	2	Same as above.	Cooling of above specimen to 909 F.
□	62-24	760-1378	2	Same as above.	Re-heating of above specimen to 2020 F.
■	62-24	486-1378	2	Same as above.	Cooling of above specimen to 415 F.
△	62-24	486-1422	2	Same as above.	Re-heating of above specimen to 2100 F.
▲	62-24	294-1422	2	Same as above.	Cooling of above specimen to 70 F.

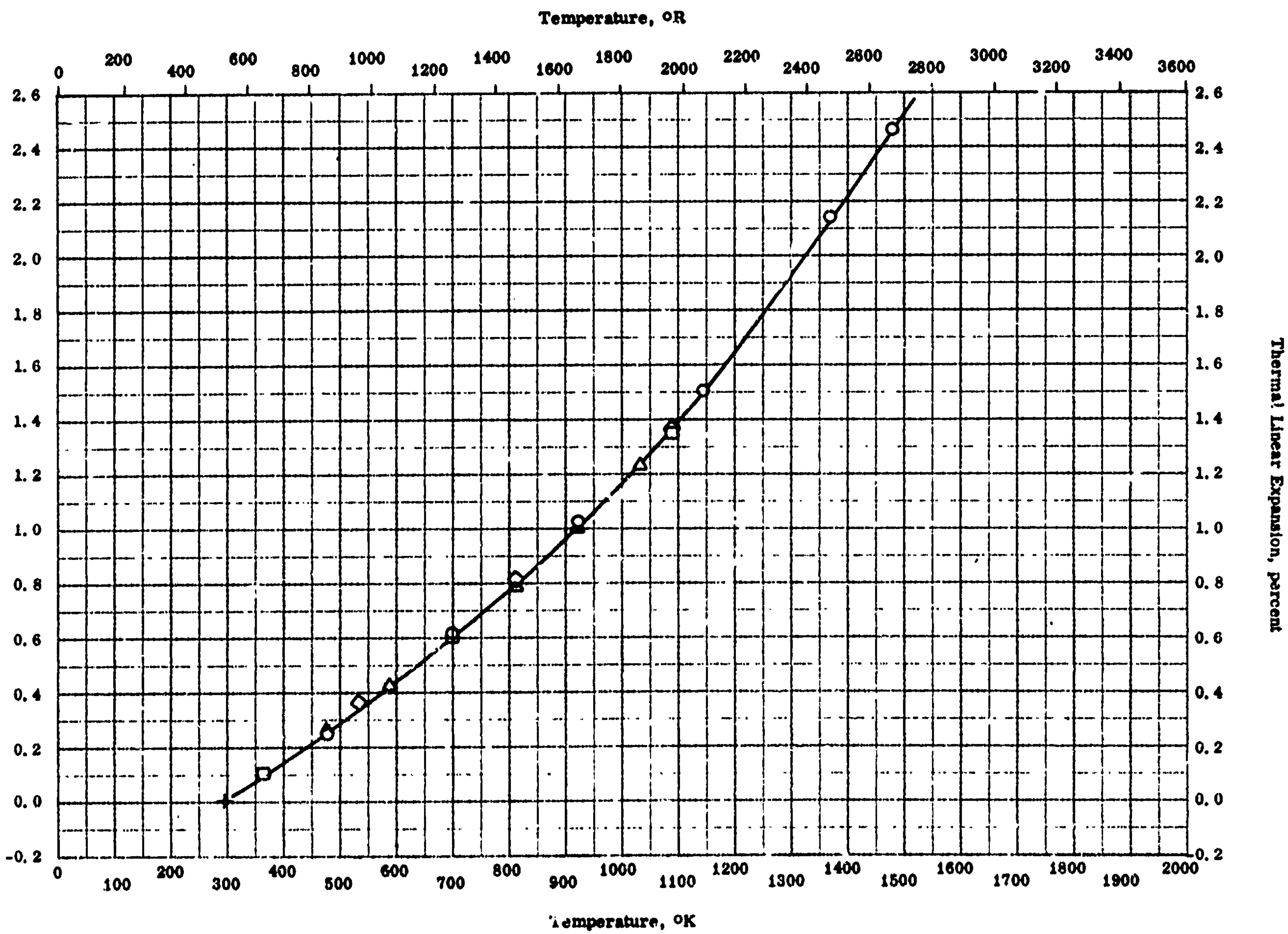


THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
$(19 < Fe < 26)$

THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
(19< Fe <26)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-5	293-1478		Alloy HU; 60.3 Ni, 19.1 Fe, 17.0 Cr, 1.43 Si, 1.13 Mn, 0.48 C, 0.23 Co, 0.22 Nb, 0.08 Mo, and 0.041 N.	Heated at 200 F per sec.
□	53-127	533-1256		50 GE-62 Braze and 50 AISI 310; nominal: 44.75 Ni, 25.6 Fe, 22.5 Cr, 6.25 Si, 1.00> Mn, and 0.125> C.	Arc melted, cast, and heated at 2260 R for 24 hrs in vacuum; data average of heating and cooling cycles at 5.5 F min $^{-1}$.
△	63-28	294-1173		AISI-664; 44.3 Ni, 22.8 Fe (by diff.), 14.9 Cr, 4.05 Mo, 3.65 W, 3.00 Ti, 1.05 Al, 0.25 Mn, 0.2 Si, 0.06 C, and 0.01 B; M.P. 2225-2550 F.	

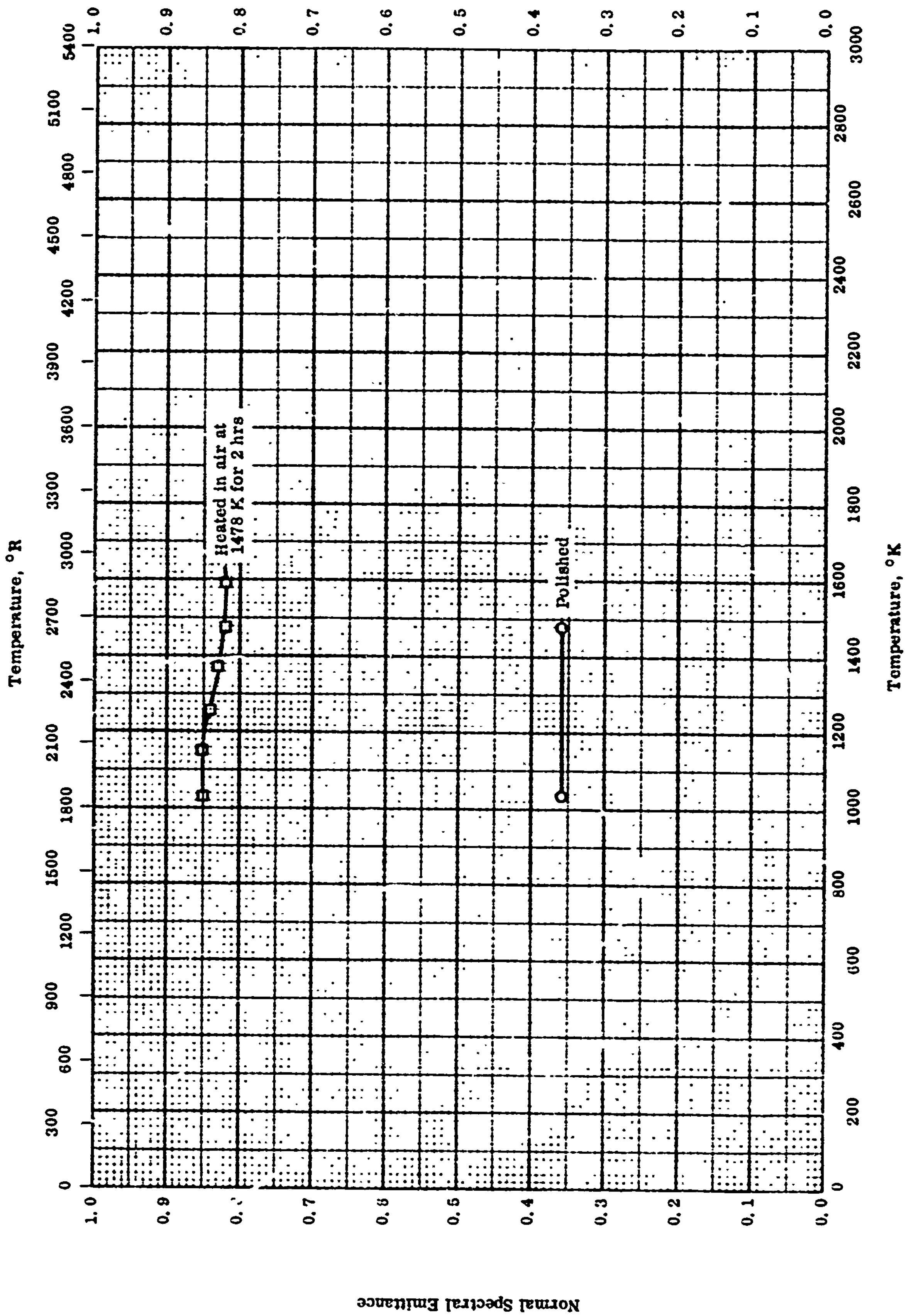


THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
($30 \le Fe \le 40$)

THERMAL LINEAR EXPANSION -- NICKEL + IRON + ΣX_i
($30 \leq Fe \leq 40$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-16	293-1478		Alloy HW; 40.0 Ni, 39.3 Fe, 17.2 Cr, 1.52 Si, 0.67 Mn, 0.66 C, 0.27 Co, 0.22 Nb, 0.12 Mo, and 0.039 N.	Heated at 200 F sec^{-1}.
△	63-23	300-1089		AISI 681; 42.5 Ni, 35.87 Fe (by diff.), 12.5 Cr, 6.0 Mo, 2.5 Ti, 0.24 Mn, 0.20 Al, 0.12 Si, 0.05 C, and 0.015 B; density 8.23 g cm^{-3}.	
□	63-28	300-1089		AISI 682; 42.5 Ni, 35.01 Fe (by diff.), 12.5 Cr, 5.7 Mo, 2.85 Ti, 0.2 Al, 0.09 Mn, 0.08 Si, 0.05 C, and 0.015 B; density 8.23 g cm^{-3}.	
◇	65-4	294-1089		Incoloy 825; formerly "Ni - O - Nel" from International Nickel Co.; nominal: 41.8 Ni, 30.0 Fe, 21.5 Cr, 3.0 Mo, 1.80 Cu, 0.90 Ti, 0.65 Mn, 0.35 Si, 0.15 Al, 0.03 C, and 0.007 S; density 0.294 lb in.$^{-3}$ and M. P. 2500 - 2550 F.	

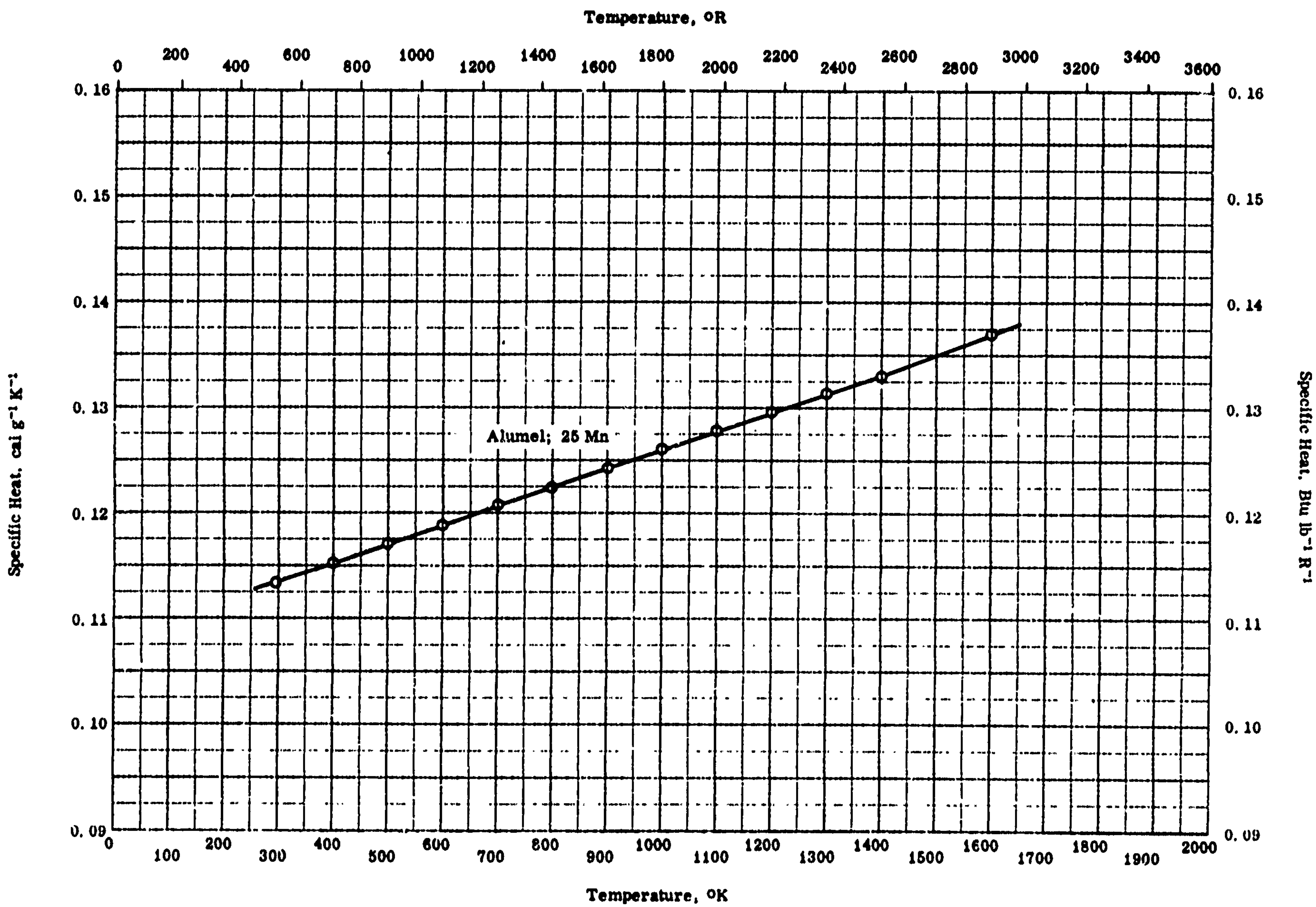


NORMAL SPECTRAL EMITTANCE -- NICKEL + IRON + ΣX_i

NORMAL SPECTRAL FMITTANCE -- NICKEL + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	39-2	0.65	1033-1478	2	60 Ni, 24 Fe, and 16 Cr.	Polished with rouge paper; measured in purified hydrogen; emittance constant over the temperature range from 1033 to 1078 K.
□	39-2	0.65	1033-1589	2	60 Ni, 24 Fe, and 16 Cr.	Polished with rouge paper, heated in air at 1478 K for 2 hrs.

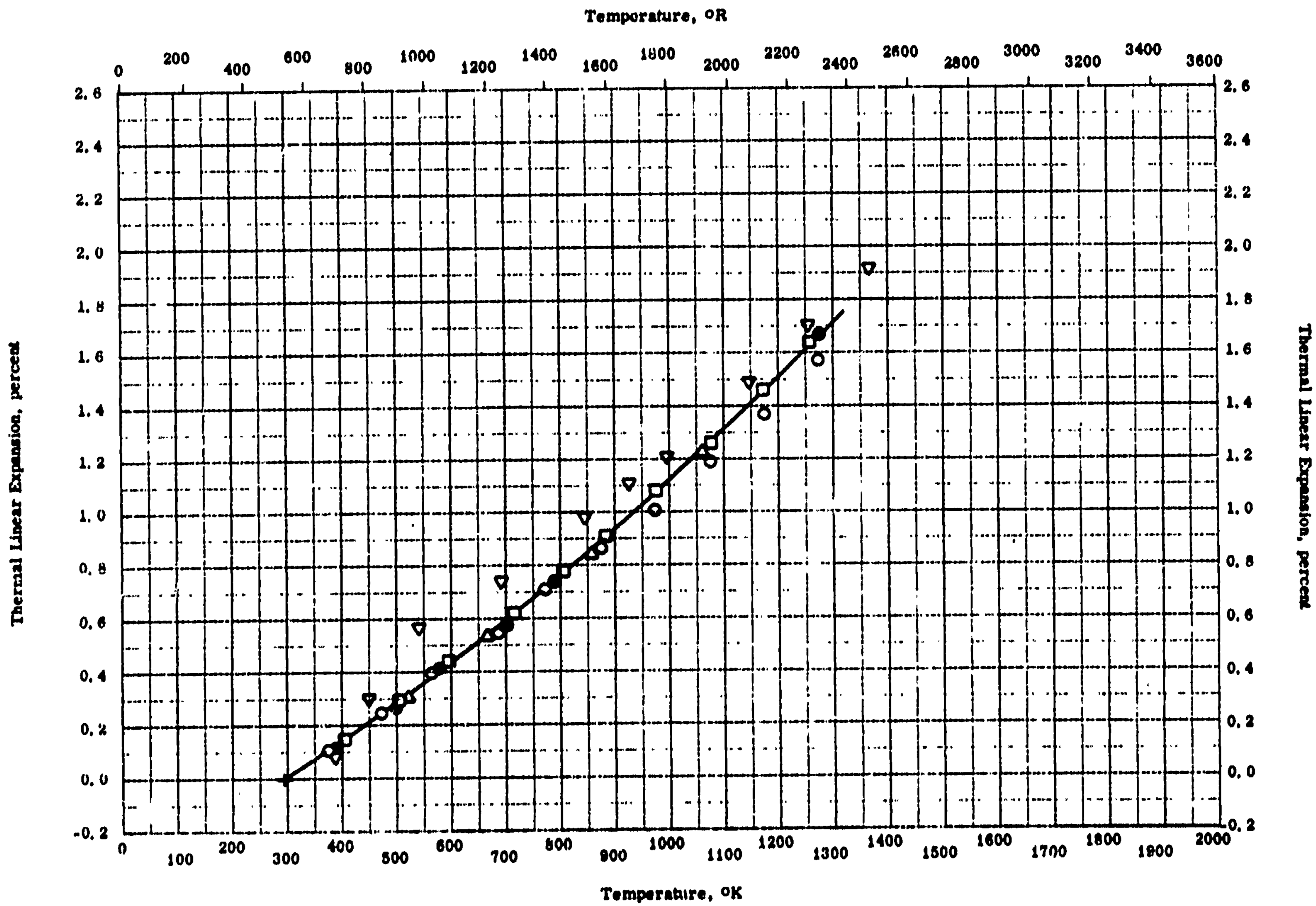


SPECIFIC HEAT -- NICKEL + MANGANESE + ΣX_i

SPECIFIC HEAT -- NICKEL + MANGANESE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-13	298-1600		Alumel; 72 Ni, 25 Mn, 2 Al, and 1 Si.	



THERMAL LINEAR EXPANSION -- NICKEL + MANGANESE + ΣX_i

THERMAL LINEAR EXPANSION -- NICKEL + MANGANESE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-52	373-1273		Haskins alloy 667; 94.5 Ni, 3.9 Mn, 0.81 Si, and 0.04 C.	Cast, hot rolled to 0.75 in. diameter, cooled in air; first heating.
●	57-52	373-1273		Same as above.	The above specimen, cooling.
□	57-52	373-1273		Same as above.	Same as above; second heating.
△	57-52	473-1073		Manganese nickel; 97.0 Ni, 1.6 Mn, 0.8 Fe, and 0.3 Cu.	Drawn to wire.
▽	58-29	302-1366	1	Wire specimen 0.006 in. dia by 0.157 in. long obtained from Driver-Harris Co., Harrison, N.J.; min 99 Ni, 0.35 Mn, 0.3 Fe, 0.2 Si, max 0.2 Cu, 0.15 C, and 0.008 S.	X-ray diffraction method.

PROPERTIES OF NICKEL + MOLYBDENUM + ΣX_i

REPORTED VALUES

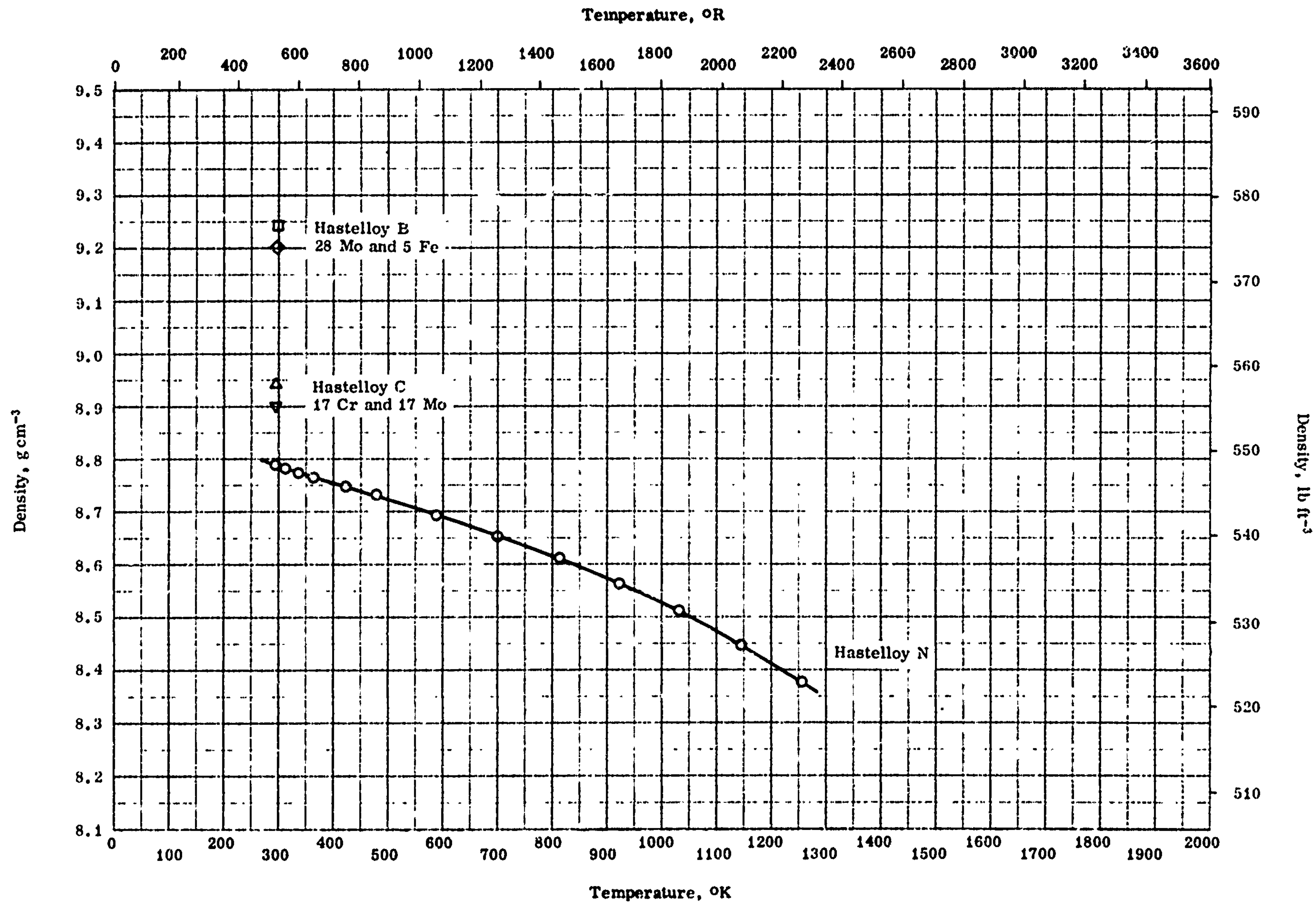
Density: See figure

Melting Point:		K	R
○	Hastelloy B	1693	3048
▽	30 Mo and 30 Cr	1553	2796
◇	22.5 Mo and 22.5 Cr	1563	2814

PROPERTIES OF NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-19	1693		Hastelloy B; nominal composition: 66 Ni, 26-30 Mo, 4-7 Fe, 0.12 >C.	M.P. depends upon material in contact with sample.
▽	55-28	1553		40 Ni, 30 Mo, and 30 Cr.	M.P. by visual observation of powder in graphite crucible.
◇	55-28	1563		55 Ni, 22.5 Mo, and 22.5 Cr.	Same as above.

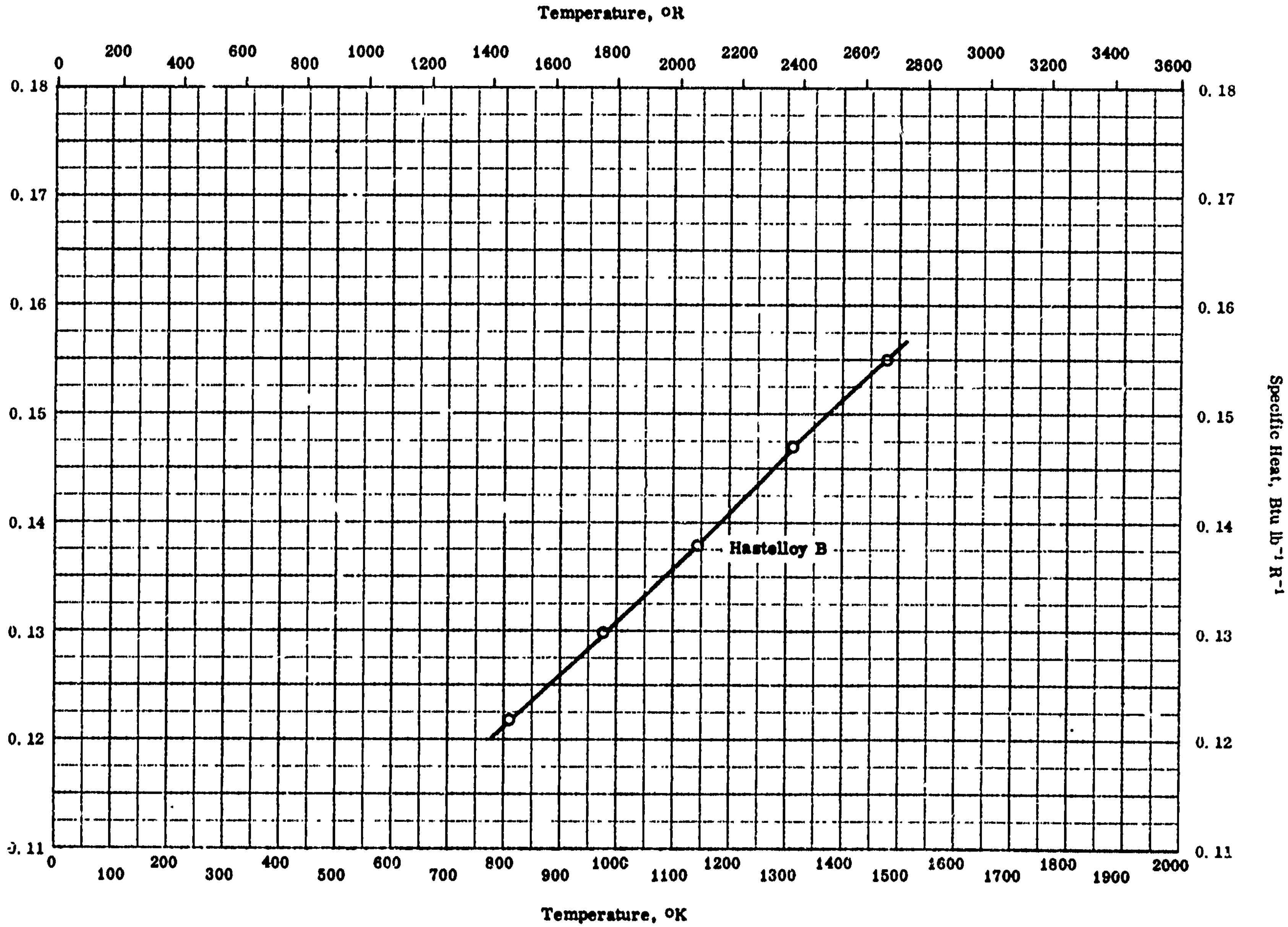


DENSITY -- NICKEL + MOLYBDENUM + ΣX_i

DENSITY -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-5	294-1255		Hastelloy N; 16.5 Mo, 7.0 Cr, 5.0 Fe, 0.8 Mn, 0.5 Si, 0.5 Al and Ti, 0.06 C, and 0.01 B.	
□	50-3	298		Hastelloy B; nominal composition: 66 Ni, 26-30 Mo, 4-7 Fe, and 0.12 > C.	
△	50-3 also 47-2	298		Hastelloy C (AMS-5530); 16-18 Mo, 15.5-17.5 Cr, 4.5-7.0 Fe, 3.75-5.25 W, and 0.15 > C.	
▽	60-15	298		52 Ni, 17 Cr, 17 Mo, 6 Fe, 4.5 W, 2.5 ≥ Co, 1.0 ≥ Mn, 1.0 ≥ Si, 0.4 V, and 0.15 ≥ C.	
◇	60-15	298		62 Ni, 28 Mo, 5 Fe, 2.5 ≥ Co, 1.0 ≥ Mn, 1.0 ≥ Si, 0.5 V, and 0.12 ≥ C.	

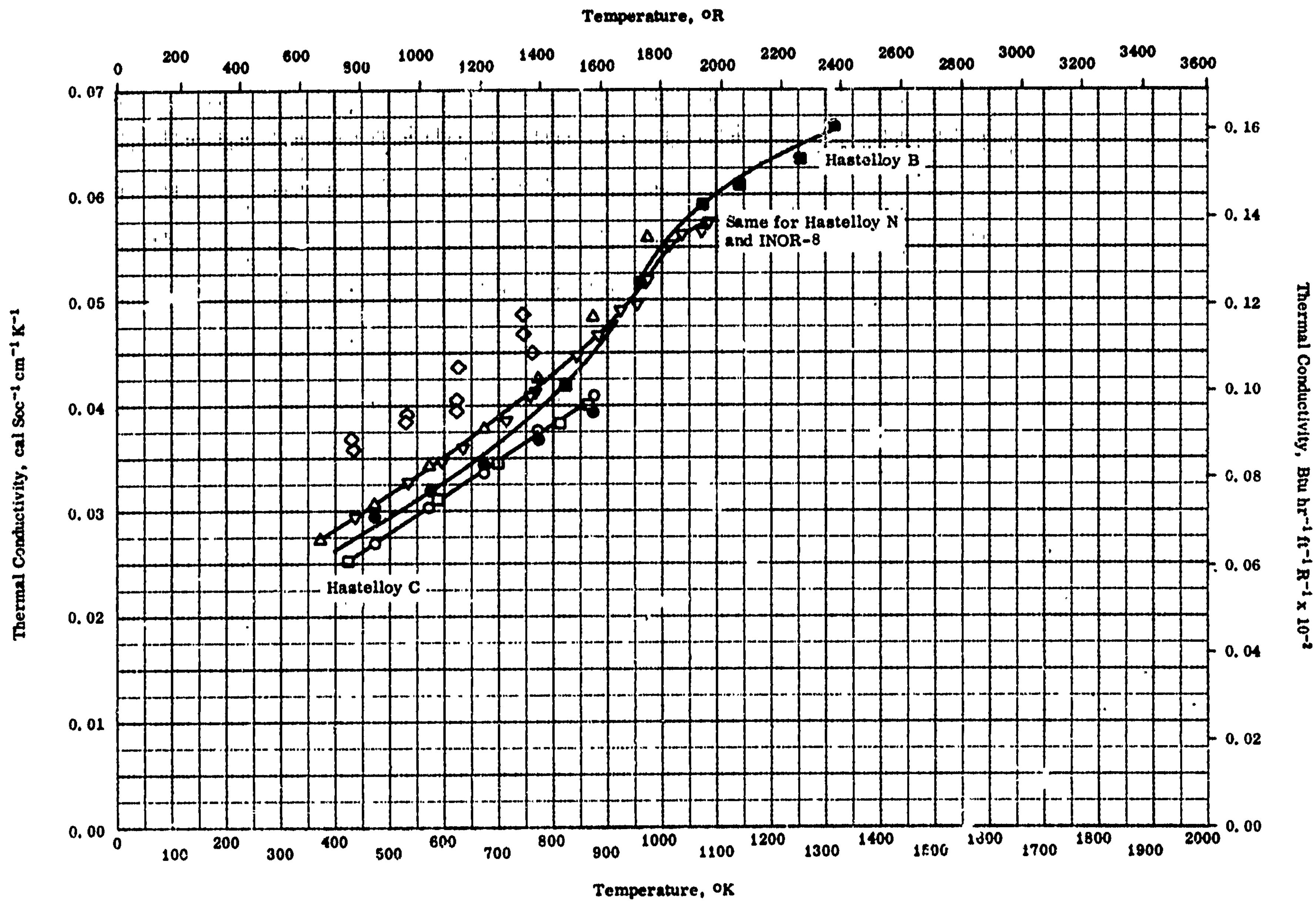


SPECIFIC HEAT -- NICKEL + MOLYBDENUM + ΣX_i

SPECIFIC HEAT -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	58-2	784-1375	3.0	Hastello, B; composition before test: 65.57 Ni, 23.78 Mo, 5.05 Fe, and 0.020 C, and after test: 65.55 Ni, 24.00 Mo, 4.96 Fe, and 0.023 C; density 585.5 lb ft^{-3}.	

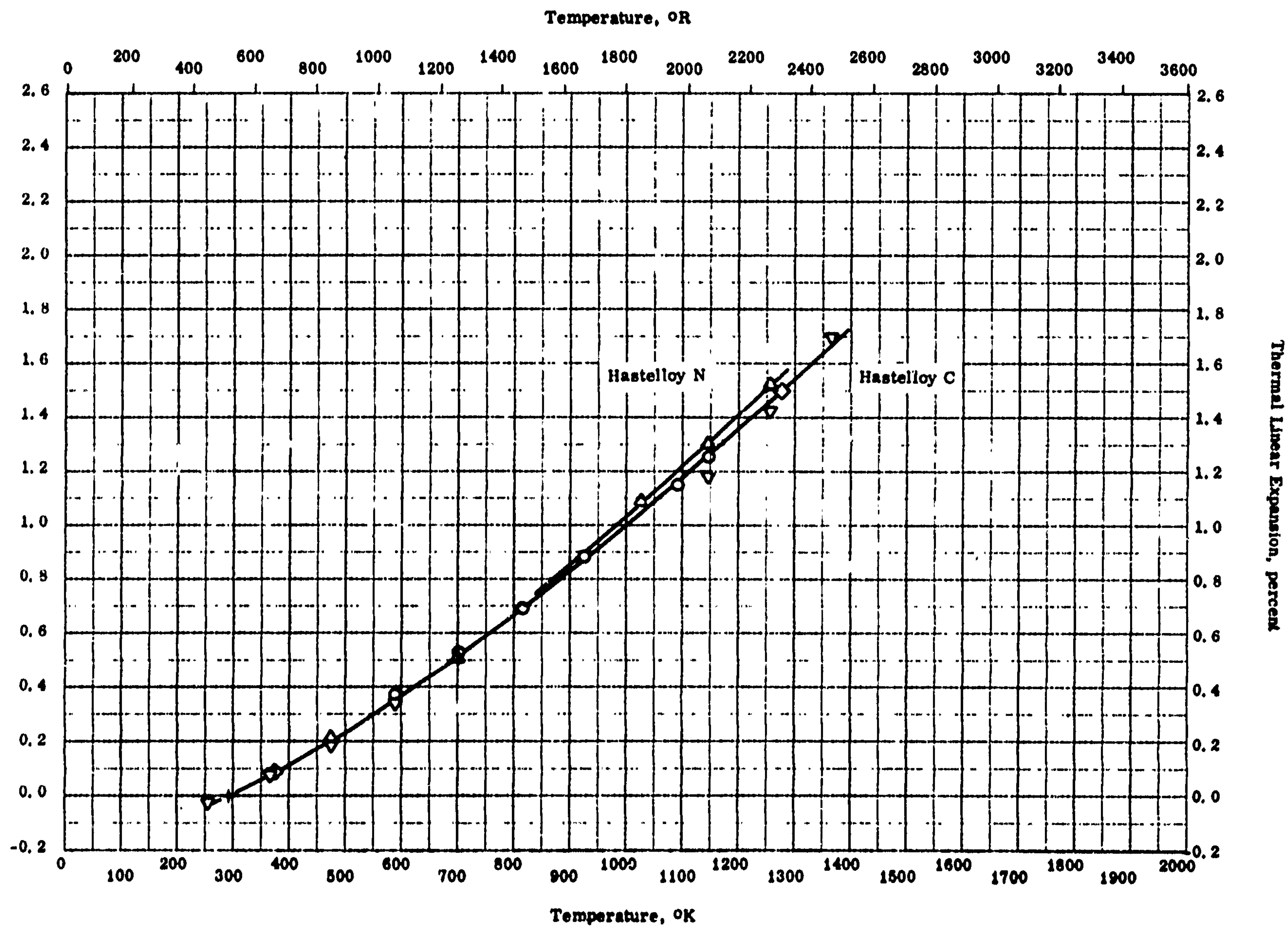


THERMAL CONDUCTIVITY -- NICKEL + MOLYBDENUM + ΣX_i

THERMAL CONDUCTIVITY -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	47-2	473-873		Hastelloy C (AMS-5530); 16-18.1 Mo, 15.5-17.5 Cr, 4.5-7.0 Fe, 3.75-5.25 W, and 0.15 max C; density 558 lb ft^{-3}.	
□	58-12	422-866		Hastelloy C; 16 Mo, 15.5 Cr, 5.5 Fe, 3.7 W, 2.5 Co, 0.35 V, and 0.08 max C.	
△	62-5	372-972		Hastelloy N; 16.5 Mo, 7 Cr, 5 Fe, 0.8 Mn, 0.5 Si, 0.5 Al + Ti, 0.06 C, and 0.01 B.	
▽	62-9	439-1090	±3	INOR-8; 71.1 Ni, 16.2 Mo, 7.25 Cr, 4.60 Fe, 0.36 Mn, 0.34 Si, 0.22 Al, 0.17 W, 0.10 Ti, 0.084 C, 0.006 S, and 0.003 P.	Prepared from a hot forged bar indentified by Westinghouse as heat M1669-4.
◇	60-7	431-761		INOR-8; composition not given.	
●	50-3	472-872		Hastelloy B; 26-30 Mo, 4-7 Fe, and 0.12 max C; density 577 lb ft^{-3}.	
■	58-2	822-1319		Hastelloy B; composition before test: 65.57 Ni, 23.78 Mo, 5.05 Fe, and 0.020 C, and after test: 65.55 Ni, 24.00 Mo, 4.96 Fe, and 0.023 C; density 585.5 lb ft^{-3}.	Precipitation of Ni_4Mo phase as particles between and within the grains.

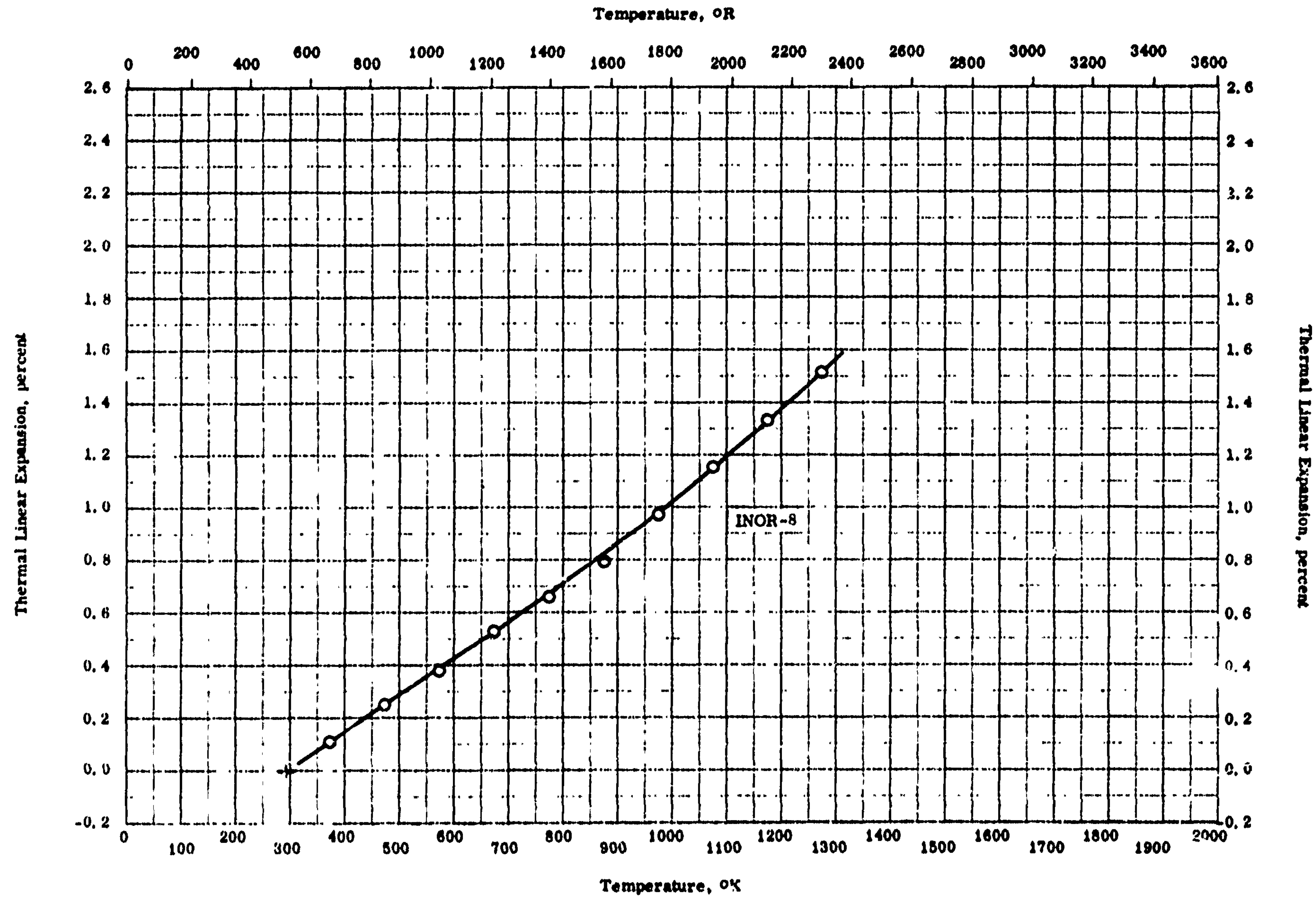


THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX_i
(15 - 18 Mo and 6 - 17.5 Cr)

THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX_i
(15 - 18 Mo and 6 - 17.5 Cr)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-25	294-1144		Hastelloy C; 47.16 - 58.50 Ni, 15.00 - 18.00 Mo, 14.50 - 17.50 Cr, 4.00 - 7.00 Fe, 3.00 - 5.25 W, 2.50 Co, 1.00 Si, 1.00 Mn, 0.08 - 0.12 C, 0.20 - 0.40 V, 0.04 P, and 0.03 S; density 8.94 g cm^{-3} and M. P. 1265 - 1343 C; electrical resistivity 130 microhm-cm at 24 C.	Average data of wrought and cast forms of alloy.
◇	63-25	273-1273		Same as above.	Same as above.
△	65-3	294-1255		Hastelloy N; 65.52 - 70.57 Ni, 15.00 - 18.00 Mo, 6.00 - 8.00 Cr, 5.00 Fe, 1.00 Si, 0.80 Mn, 0.50 (Al + Ti), 0.50 W, 0.35 Cu, 0.20 Co, 0.04 - 0.08 C, 0.020 S, 0.015 P, and 0.010 B; density 8.93 g cm^{-3} and M. P. 1300 - 1400 C.	
▽	50-3	256-1367		Hastelloy C (AMS - 5530); nominal: 16.0 - 18.0 Mo, 15.5 - 17.7 Cr 4.5 - 7.0 Fe, 3.75 - 5.25 W, and 0.15 max C; density 558 lb ft^{-3}.	

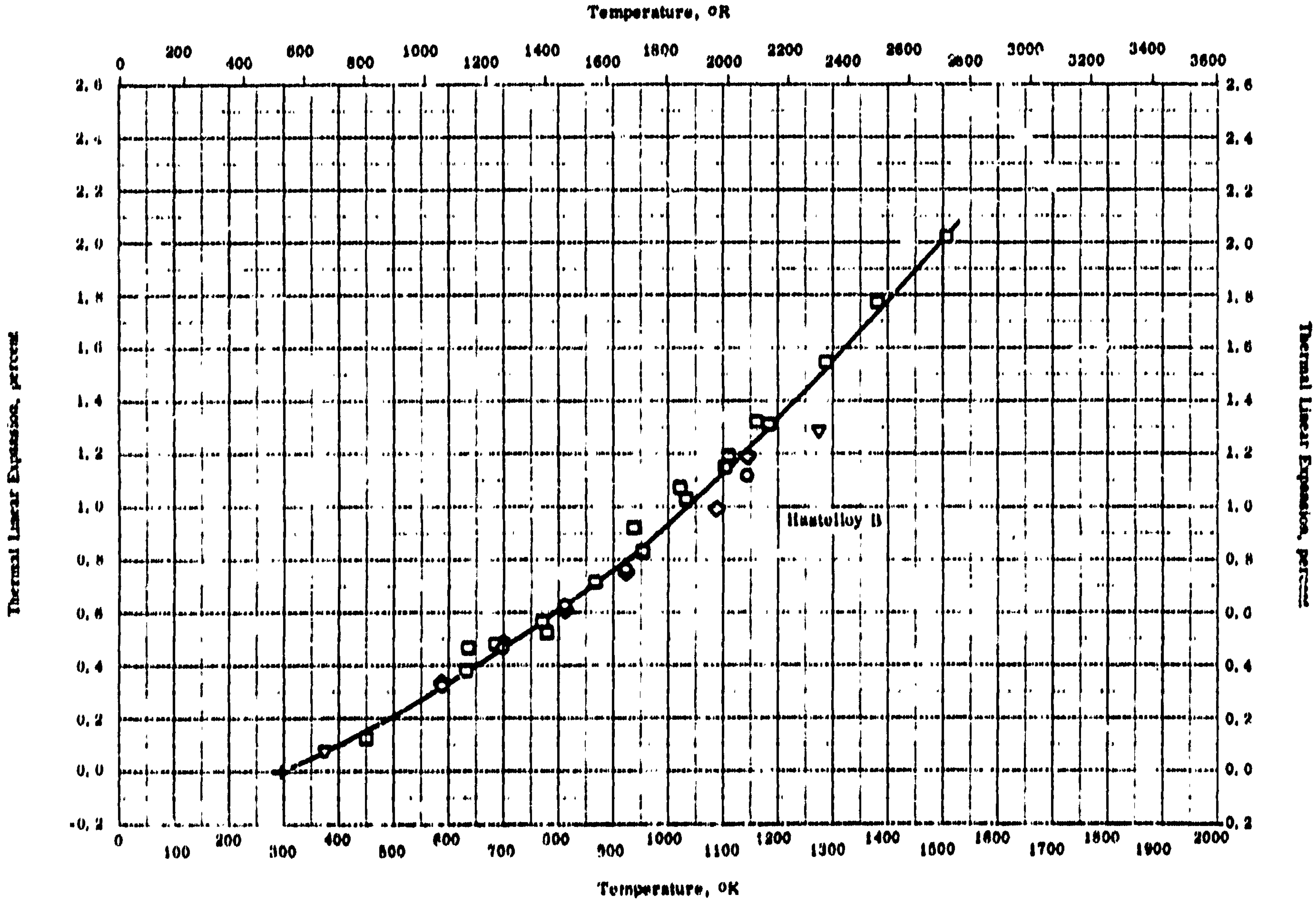


THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX_i
(16.9 Mo and 6.86 Cu)

THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX_i
(16.9 Mo and 6.86 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	57, 63	373-1272	1	INOR-8; 16.90 Mo, 6.86 Cu, 4.21 Fe, 0.84 Mn, 0.23 Si, and 0.14 C.	

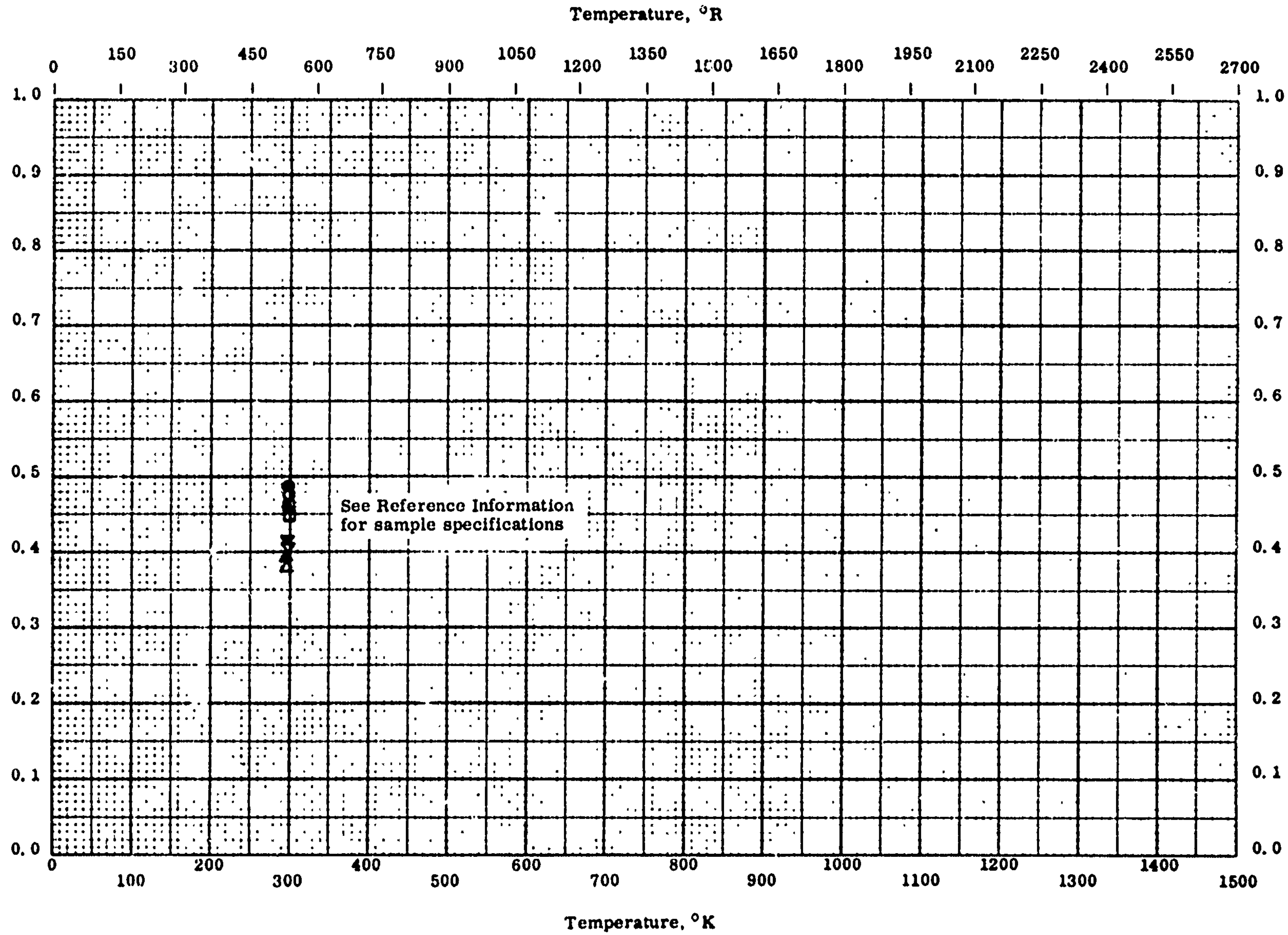


THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX$_i$
(23.8 - 30 Mo and 4 - 7 Fe)

THERMAL LINEAR EXPANSION -- NICKEL + MOLYBDENUM + ΣX_i
(23.8 - 30 Mo and 4 - 7 Fe)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-3	589-1145		Hastelloy Alloy B; nominal: 26.0 - 30.0 Mo, 4.0 - 7.0 Fe, and 0.12 max C; density 577 lb ft^{-3}.	
□	58-2	300-1503		Hastelloy B; before test: 65.57 Ni, 23.78 Mo, 5.05 Fe, 0.020 C; after test: 65.55 Ni, 24.00 Mo, 4.96 Fe, and 0.023 C; density 585.5 lb ft^{-3}.	
◇	60-21	294-1144		Hastelloy B; nominal: 26.00 - 30.00 Mo, 4.00 - 7.00 Fe, 2.5 Co, 1 Cr, Si, Mn each, 0.05 C, 0.2 - 0.6 V, 0.04 P, and 0.03 S; density 9.24 g cm^{-3} and M. P. 1320 - 1350 C; electrical resistivity 135.0 microhm-cm at 24 C.	
▽	60-21	273-1273		Same as above.	

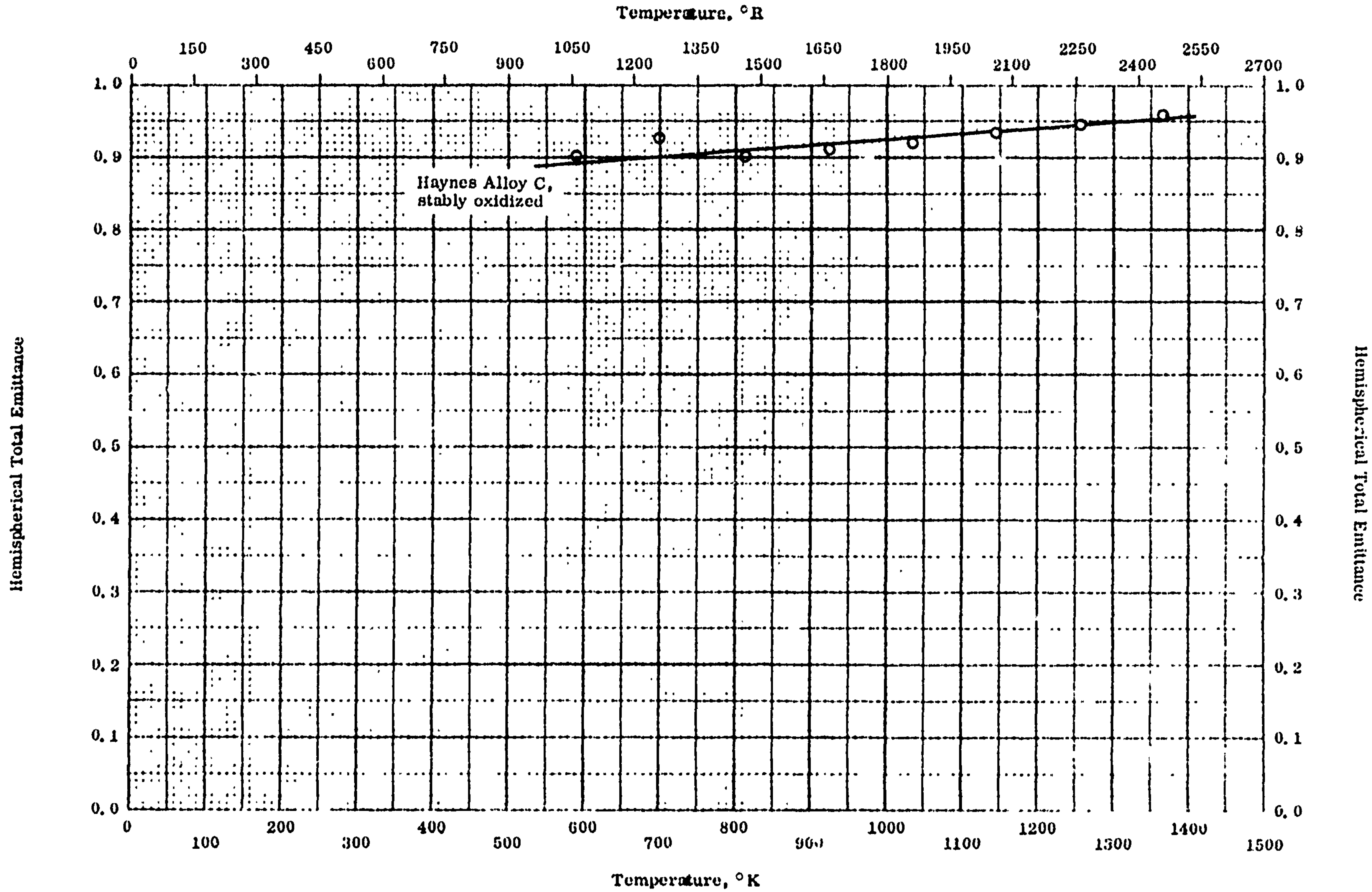


SOLAR ABSORPTANCE -- NICKEL + MOLYBDENUM + ΣX_i

SOLAR ABSORPTANCE -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-48	298		Hastelloy B, nominal: 28 Mo, 5.5 Fe, 1 > Cr, 1 > Mn, 1 Si, and 0.12 C; aircraft grade; surface finish 15 μ in. RMS.	Annealed; above atmosphere.
●	57-48	298		Same as above.	The above specimen at sea level.
△	57-48	298		Hastelloy B; aircraft grade; surface finish 2 μ in. RMS.	Annealed; above atmosphere.
▲	57-48	298		Same as above.	The above specimen at sea level.
□	57-48	298		Hastelloy C, nominal: 17 Mo, 16.5 Cr, 6 Fe, 4 W, 1 Mn, 1 Si, and 0.15 max C; grade AMS 5530 C; surface finish 15 μ in. RMS.	Annealed; above atmosphere.
■	57-48	298		Same as above.	The above specimen at sea level.
▽	57-48	298		Hastelloy C; grade AMS 5530 C; surface finish 2 μ in. RMS.	Annealed; above atmosphere.
▼	57-48	298		Same as above.	The above specimen at sea level.

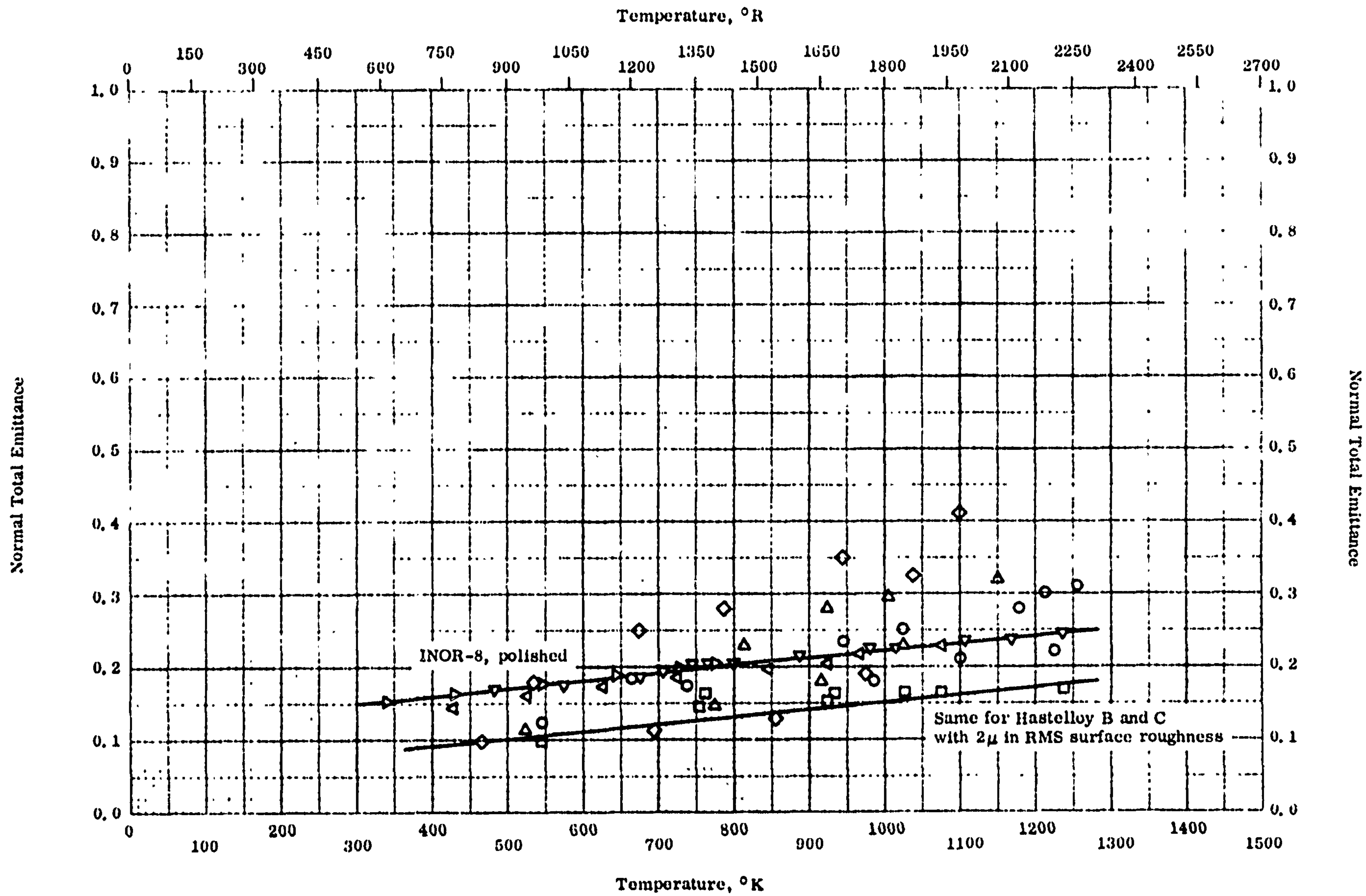


HEMISPHERICAL TOTAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

HEMISPHERICAL TOTAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specification	Remarks
o	59-17	589-1366		Haynes alloy C; nominal: 52 - 60 Ni, 16 - 18 Mo, 15.5 - 17.5 Cr, 4.5 - 7.0 Fe, 3.75 - 5.25 W, and 0.15 max. C.	Cleaned, polished, washed, and stably oxidized in air at 1366 K for 35 min.

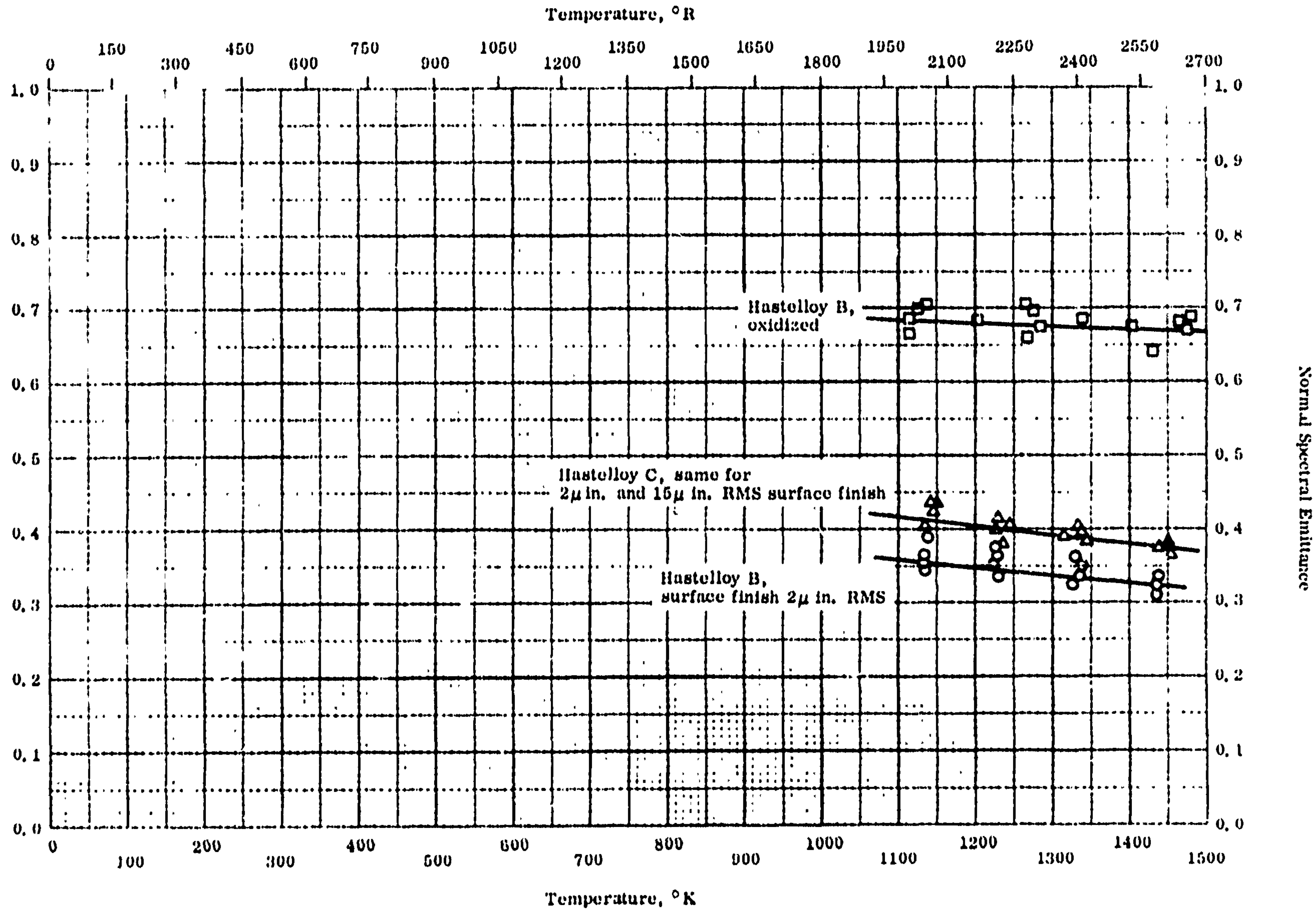


NORMAL TOTAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

NORMAL TOTAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-48	544-1255	± 10	Hastelloy B, nominal: 28 Mo, 5.5 Fe, 1 max. Cr, 1 max. Mn, 1 Si, and 0.12 C; aircraft grade; surface finish 15 μ in. RMS.	Measured in a vacuum of 5×10^{-4} mm Hg.
□	57-48	544-1239	± 10	Hastelloy B; aircraft grade; surface finish 2 μ in. RMS.	Measured in a vacuum of 5×10^{-4} mm Hg.
△	57-48	522-1150	± 10	Hastelloy C, nominal: 17 Mo, 16.5 Cr, 6 Fe, 4 W, 1 Mn, 1 Si, and 0.15 max. C; grade AMS 5530 C; surface finish 15 μ in. RMS.	Measured in a vacuum of 5×10^{-4} mm Hg.
◇	57-48	466-1100	± 10	Hastelloy C, grade AMS 5530 C; surface finish 2 μ in. RMS.	Measured in a vacuum of 5×10^{-4} mm Hg.
▽	63-20	481-1234	± 2.7	INOR-8; 70 Ni, 17 Mo, 7 Cr, 5 Fe, 0.8 Mn, 0.05 Al + Ti, and 0.06 C.	Rough hand-polished with 4-P metallographic paper, then polished with A and B alumina and finally polished with diamond paste; 5×10^{-6} mm Hg vacuum; heating.
◁	63-20	428-1072	± 2.7	Same as above.	The above specimen; cooling.
▷	63-20	340-776	± 2.7	Same as above; hollow cylinder with 1/32 in. wall thickness.	Polished; 5×10^{-6} mm Hg vacuum.

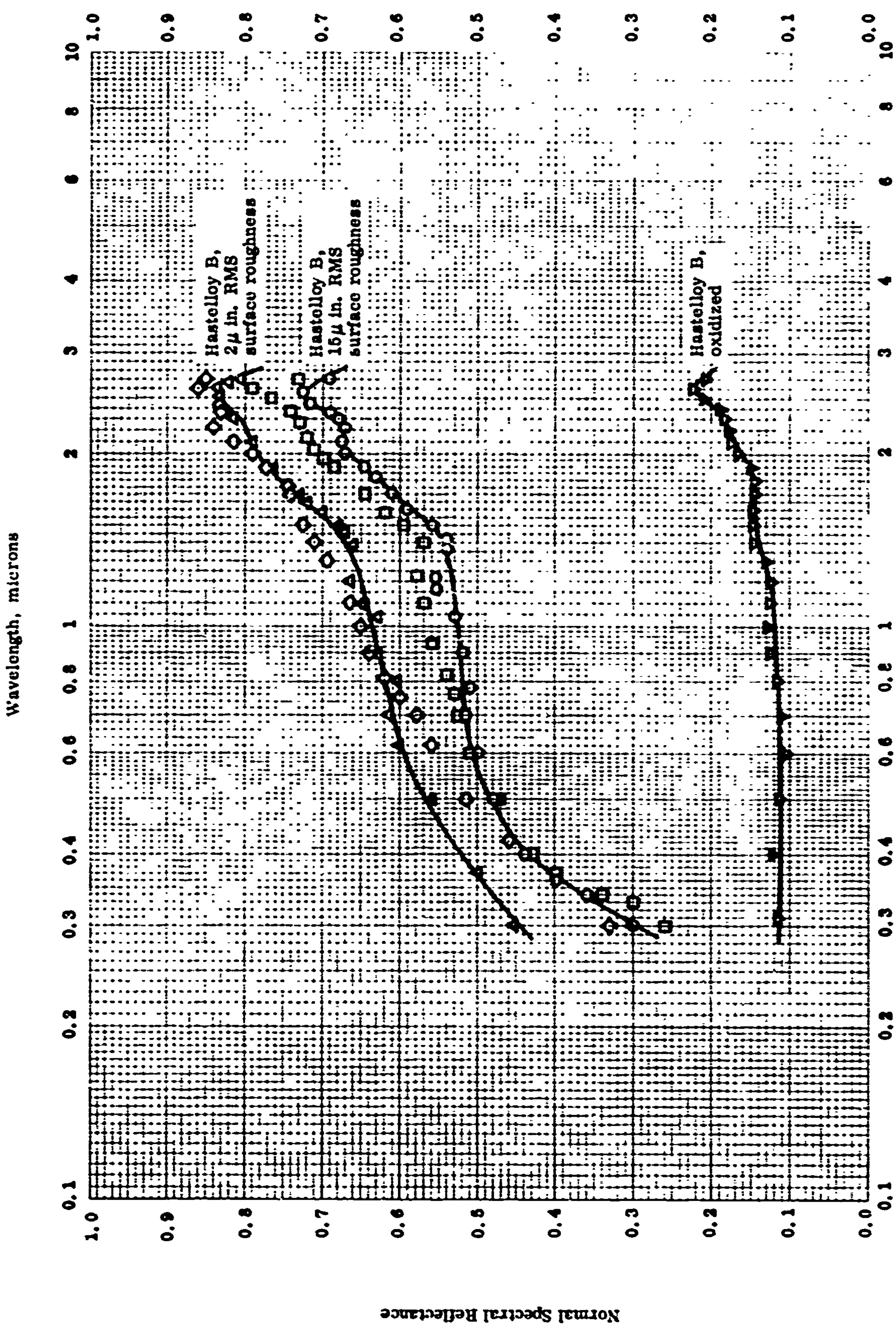


NORMAL SPECTRAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

NORMAL SPECTRAL EMITTANCE -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	57-48	0.665	1133-1439		Hastelloy B; nominal: 28 Mo, 5.5 Fe, 1 max. Cr, 1 max. Mn, 1 Si, and 0.12 C; aircraft grade; surface finish 2 μ in. RMS.	Measured in vacuum.
□	57-48	0.665	1114-1480		Hastelloy B; aircraft grade; surface finish 2 μ in. RMS.	Oxidized in air at red heat for 30 min.; measured in vacuum.
△	57-48	0.665	1136-1453		Hastelloy C; nominal: 17 Mo, 16.5 Cr, 6 Fe, 4 W, 1 Mn, 1 Si, and 0.15 max. C; grade AMS 5530 C; surface finish 2 μ in. RMS.	Measured in vacuum; same emittance value for 15 μ in. RMS surface finish.

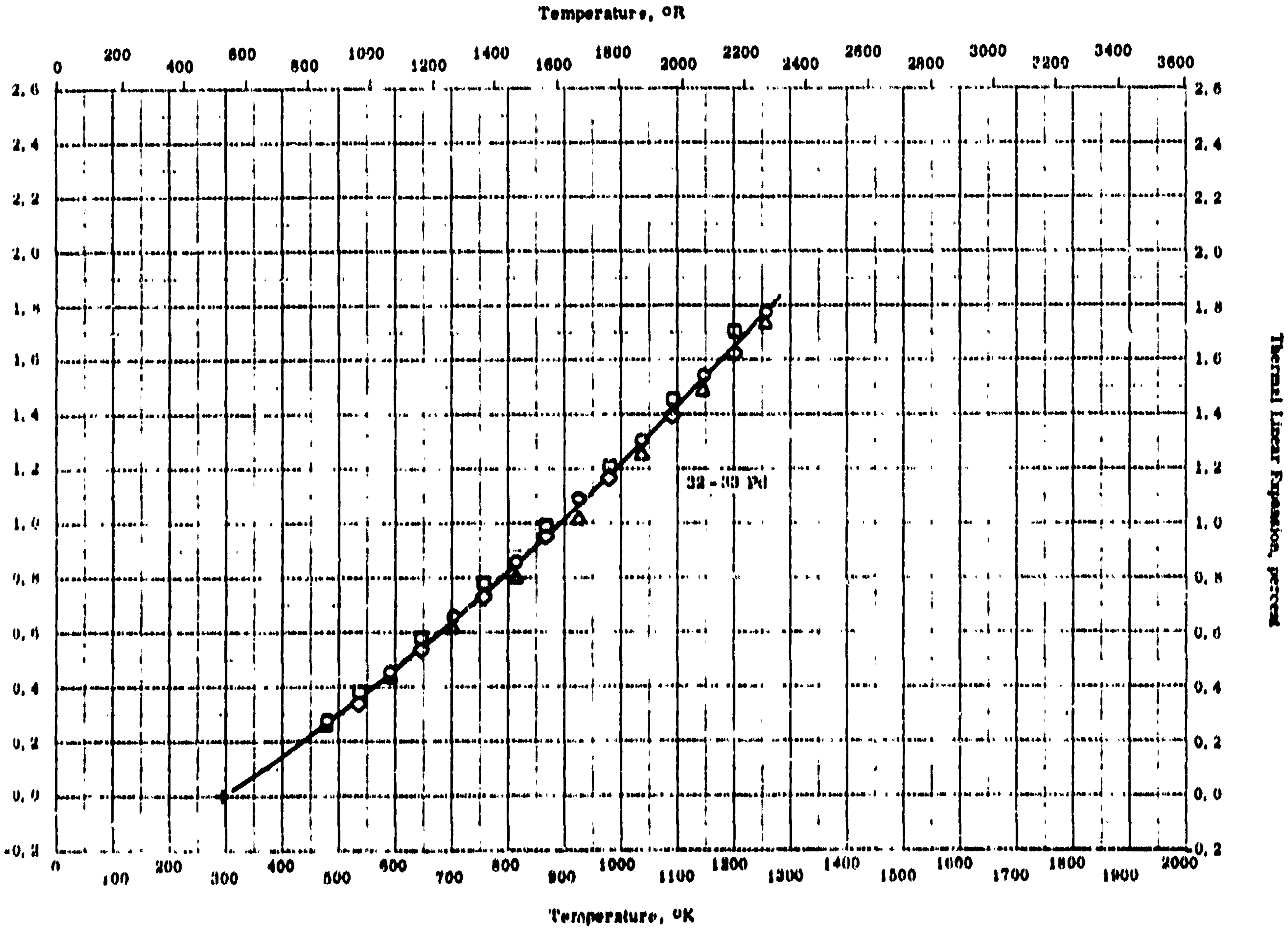


NORMAL SPECTRAL REFLECTANCE -- NICKEL + MOLYBDENUM + ΣX_i

NORMAL SPECTRAL REFLECTANCE -- NICKEL + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	57-48	298	0.3-2.7		Hastelloy B, nominal: 28 Mo, 5.5 Fe, 1 max. Cr, 1 max. Mn, 1 Si and 0.12 C; aircraft grade; surface finish 15 μ in. RMS.	Annealed.
△	57-48	298	0.3-2.7		Hastelloy B; aircraft grade; surface finish 2 μ in. RMS.	Annealed.
▽	58-25	298	0.31-2.7		Hastelloy B; aircraft grade.	Oxidized.
□	57-48	298	0.3-2.7		Hastelloy C: nominal: 17 Mo, 16.5 Cr, 6 Fe, 4 W, 1 Mn, 1 Si, 0.15 max. C; grade AMS 5530 C; surface finish 15 μ in. RMS.	Annealed.
◇	57-48	298	0.3-2.7		Hastelloy C; grade AMS 5530 C; surface finish 2 μ in. RMS.	Annealed.

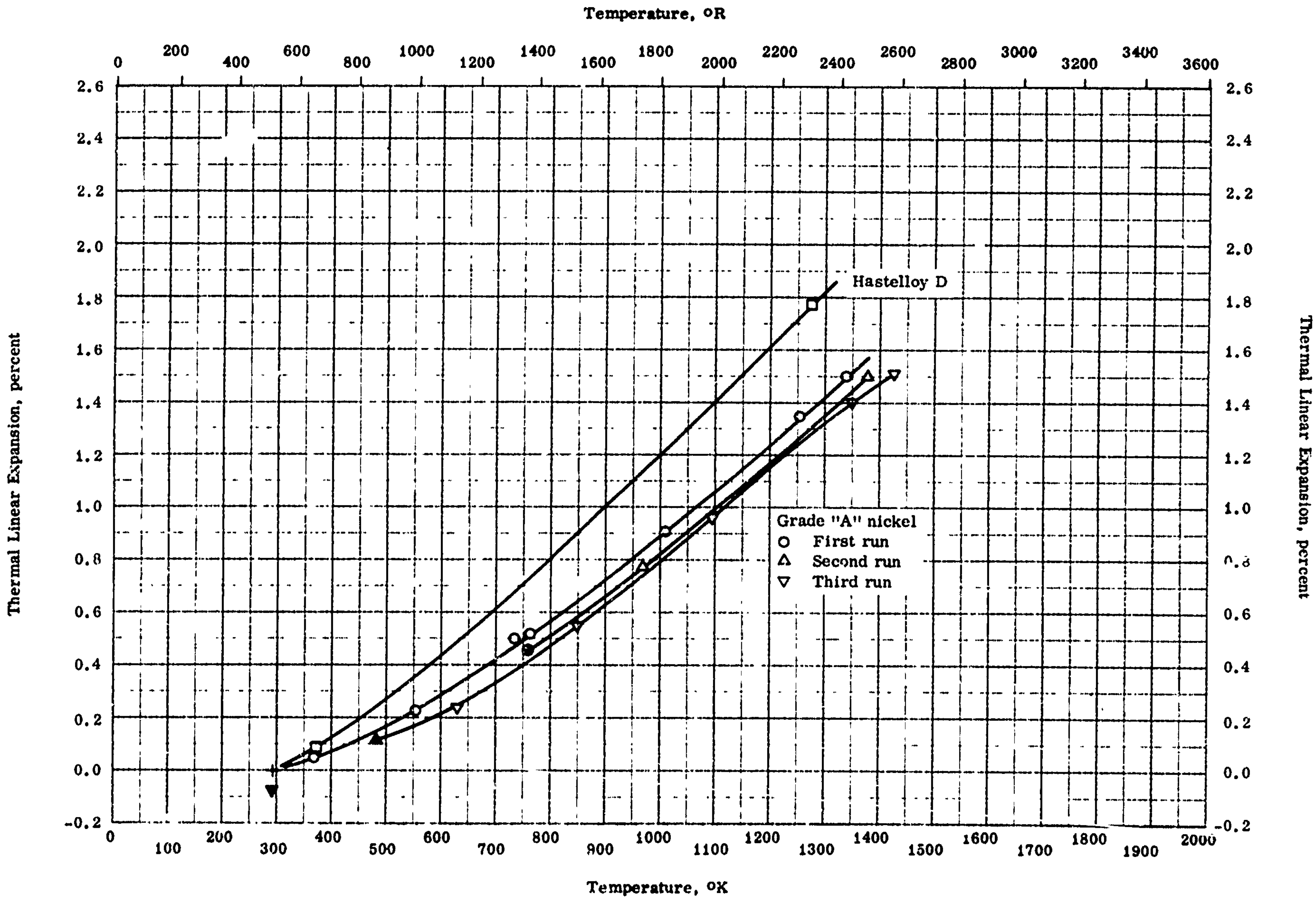


THERMAL LINEAR EXPANSION -- NICKEL + PALLADIUM -- ΣX_1

THERMAL LINEAR EXPANSION -- NICKEL + PALLADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-30	478-1256	± 2	75 GE-76 brazing alloy and 25 Nichrome V; 44.75 N, 33 Pd, 22.25 Cr, 0.04 Si, and 0.01 S.	As cast.
□	54-30	478-1256	± 2	Same as above.	Same as above; then heat treated 24 hrs at 2000 F in argon.
△	54-30	478-1256	± 2	50 Ge-76 brazing alloy and 50 Nichrome V; 56.5 Ni, 22 Pd; 21.5 Cr, 0.025 Si, and 0.007 S.	As cast.
◇	54-30	478-1256	± 2	Same as above.	Same as above; heat treated 24 hrs at 2000 F in argon.

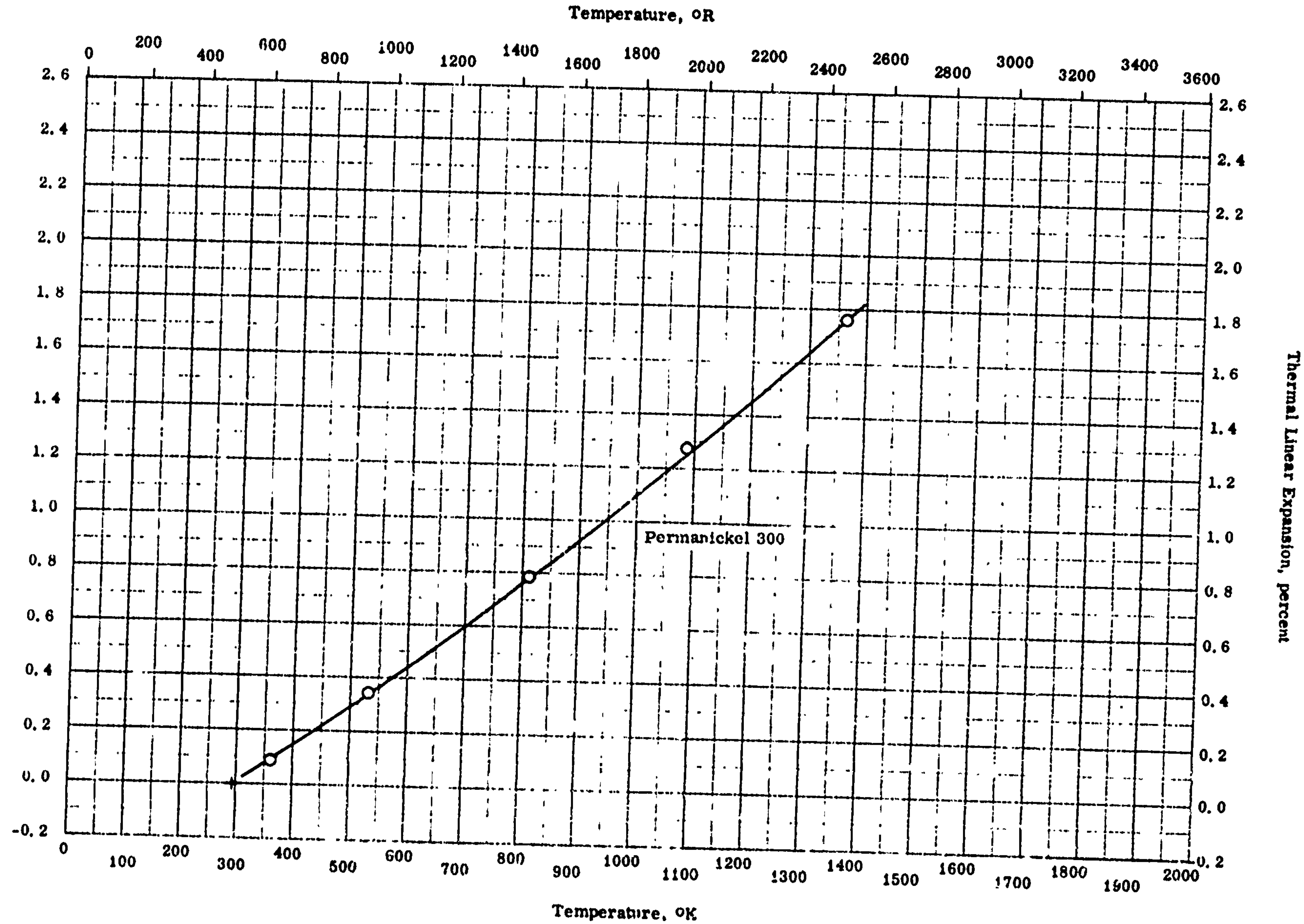


THERMAL LINEAR EXPAN.'ION -- NICKEL + SILICON + ΣX_i

THERMAL LINEAR EXPANSION -- NICKEL + SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	60-23	273-1273		Hastelloy D; 80.13 - 84.38 Ni, 8.50 - 10.00 Si, 2.00 - 4.00 Cu, 2.00 Fe, 1.50 Co, 1.00 Cr, 0.50 - 1.25 Mn, and 0.12 C; density 7.80 g cm^{-3}, M.P. 1110 - 1120 C, and electrical resistivity 113.6 microhm-cm at 24 C.	Sand cast.
○	62-24	294-1339	2	Grade "A"; J.M. Tully Metal and Supply Co.; 98.18 Ni, 0.5 Si, 0.5 Fe, 0.35 Mn, 0.25 Cu, 0 2 C, and 0.02 S; density 546 lb ft^{-3} by vol displacement.	Cold rolled from melt; measured in argon.
●	62-24	1339-760	2	Same as above.	Cooling data of above specimen.
△	62-24	760-1377	2	Same as above.	Re-heating of above specimen.
▲	62-24	1377-486	2	Same as above.	Cooling data of above specimen.
▽	62-24	486-1422	2	Same as above.	Re-heating again.
▼	62-24	1422-294	2	Same as above.	Cooling data of above specimen.

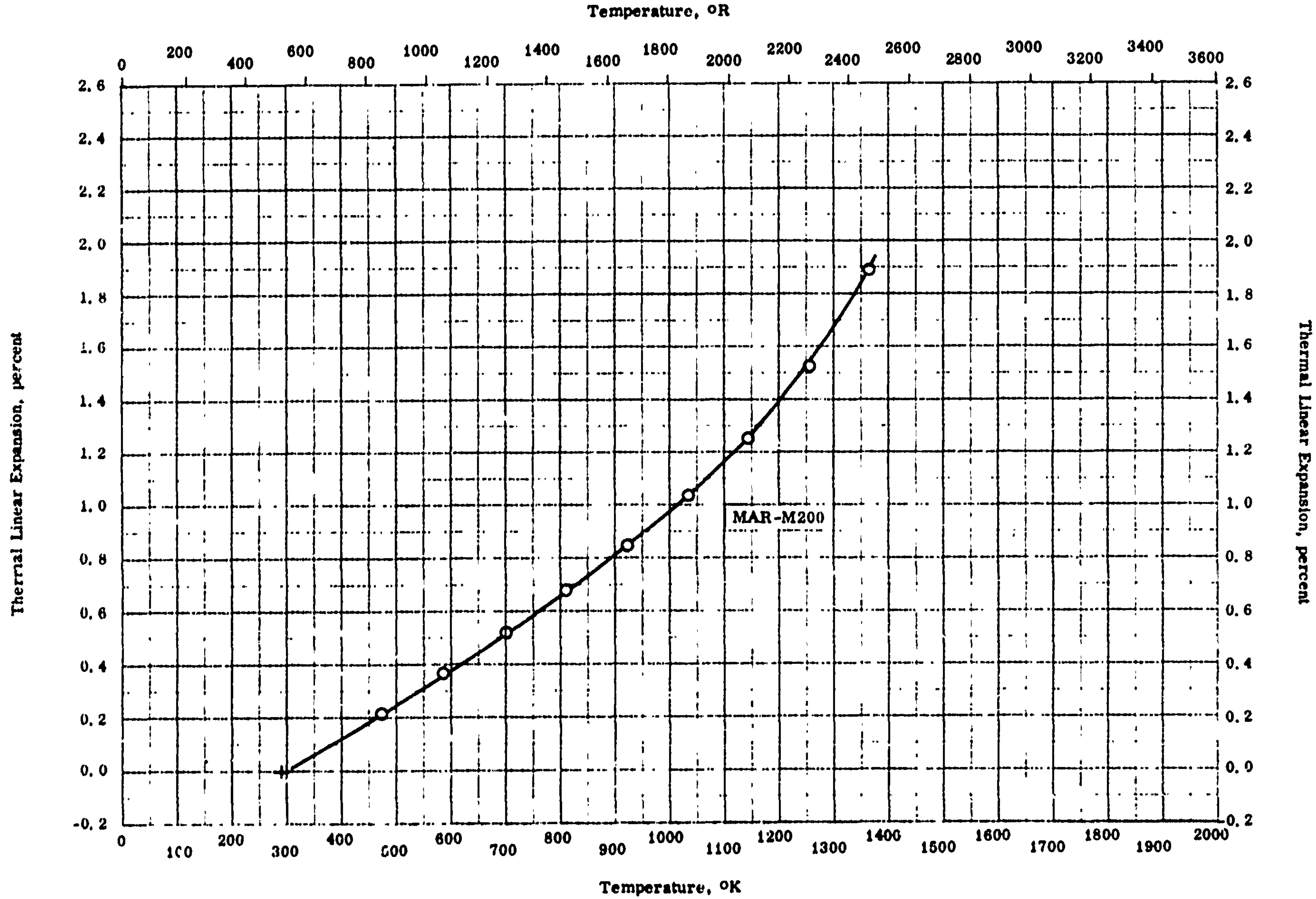


THERMAL LINEAR EXPANSION -- NICKEL + TITANIUM + ΣX_i

THERMAL LINEAR EXPANSION -- NICKEL + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	65-4	294-1367		Permanickel Alloy 300; formerly "Permanickel Alloy" from International Nickel Co.; nominal: 98.6 Ni, 0.50 Ti, 0.35 Mg, 0.25 C, 0.10 Fe, 0.10 Mn, 0.06 Si, 0.02 Cu, and 0.005 S; density 0.316 lb in.$^{-3}$	

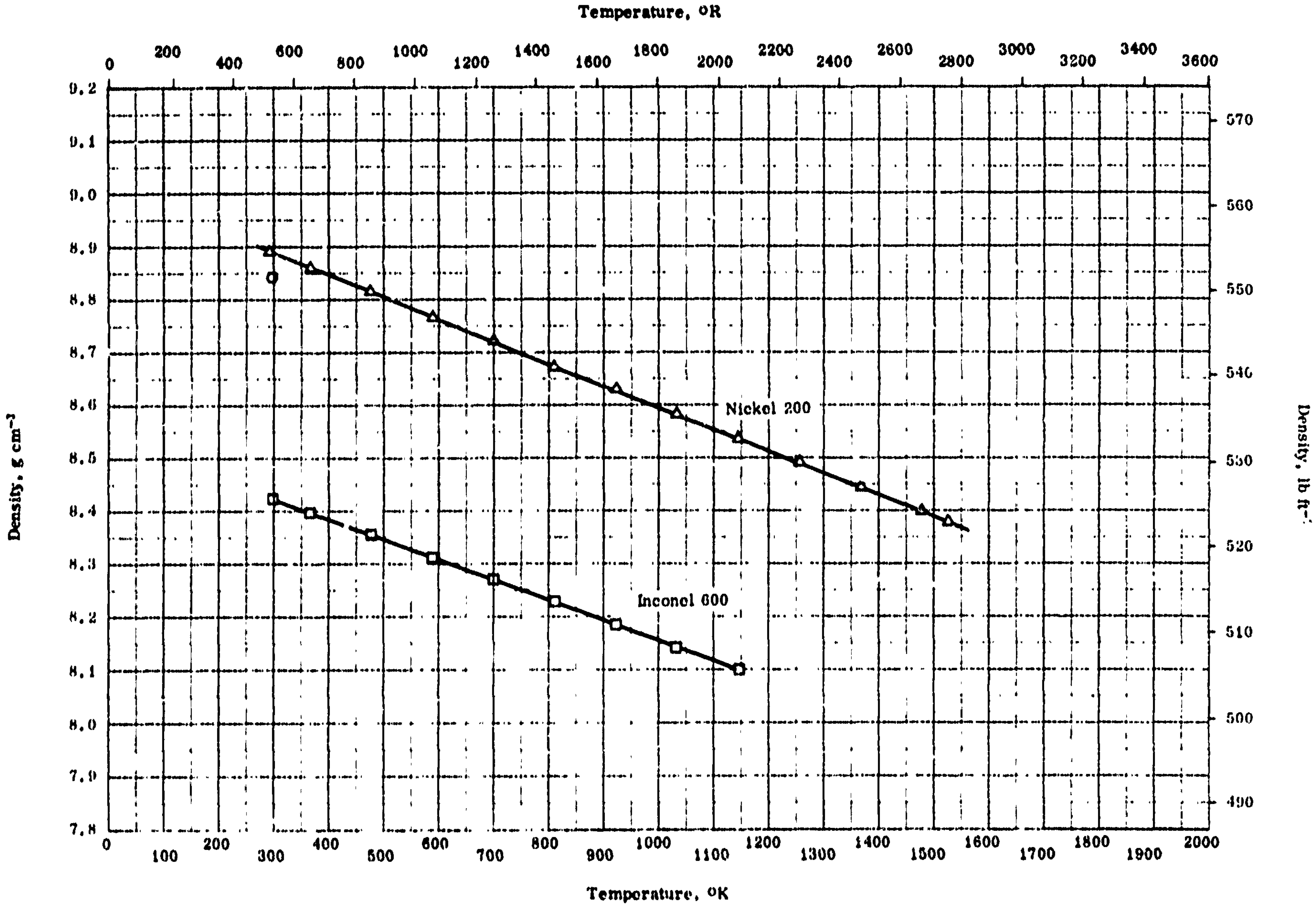


THERMAL LINEAR EXPANSION -- NICKEL + TUNGSTEN + ΣX_i

THERMAL LINEAR EXPANSION -- NICKEL + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	64-11	300-1367		MAR-M200 (former design SM200); bal Ni, 11.5 - 13.5 W, 9.0 - 11.0 Co, 8.0 - 10.0 Cr, 4.75 - 5.25 Al, 1.75 - 2.25 Ti, 0.75 - 1.25 Nb, 1.5 max Fe, 0.12 - 0.17 C, 0.03 - 0.08 Zr, 0.01 - 0.02 B, and 0.2 max M, Si each; density 0.304 lb in.$^{-3}$ and M. P. 2400 - 2450 F.	As cast.

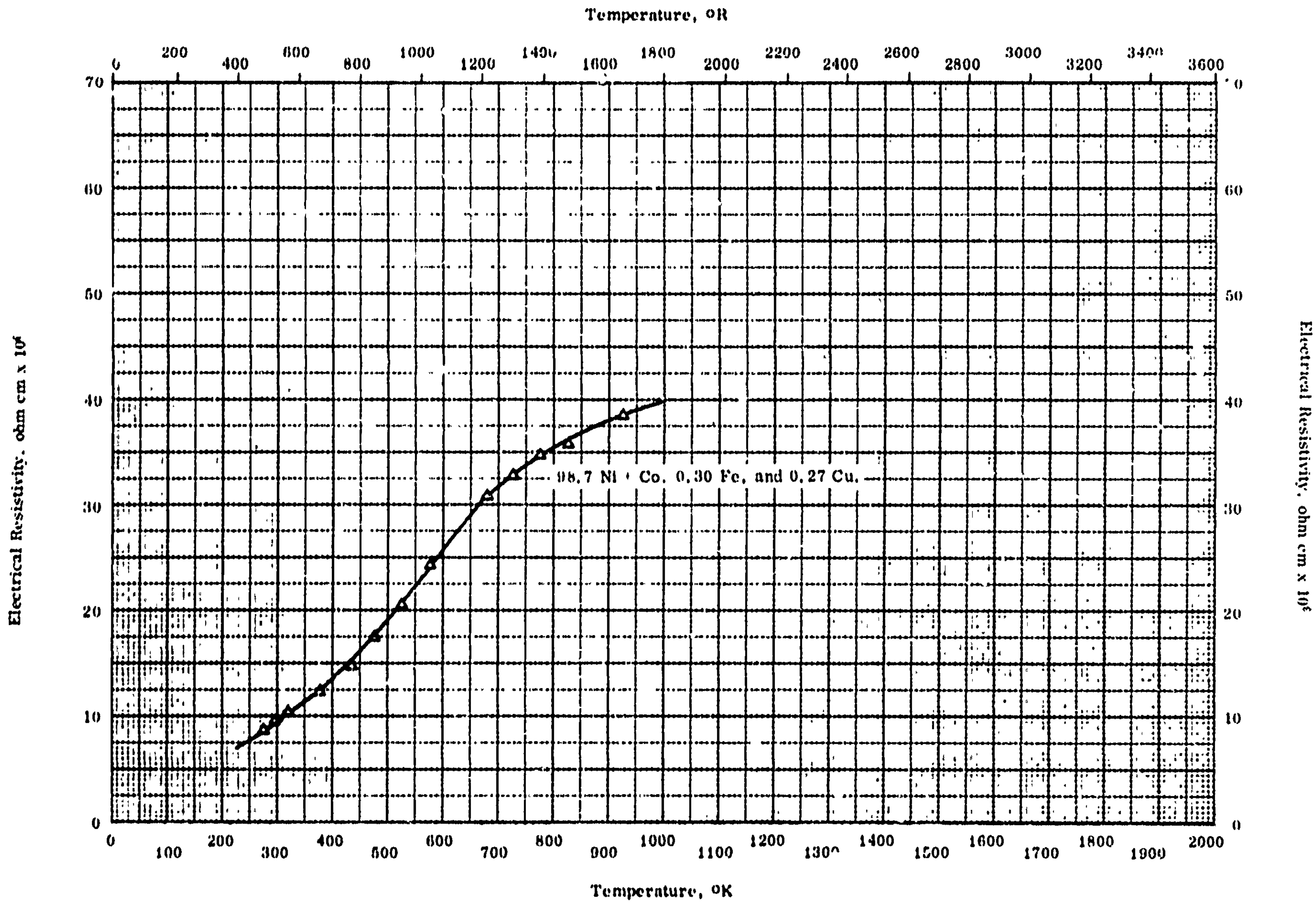


DENSITY -- NICKEL + ΣX_i

DENSITY -- NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	55-18	293		98.70 Ni + Co, 0.30 Fe, 0.27 Mn, 0.20 Cu, 0.18 Mg, 0.17 C, 0.14 SiO_2, and 0.04 Si.	Cast, rolled at 1150 C, annealed at 900 C, cold-drawn, and then annealed at 700 C.
□	62-7	300-1145		Inconel 600; 73.55 Ni + Co, 16 Cr, 7.55 Fe, 2.30 Nb + Ta, 0.30 Si, 0.2 Mn, 0.04 C, 0.03 Cu, and 0.005 S.	
△	62-17	294-1527		Nickel 200 (Nickel A).	

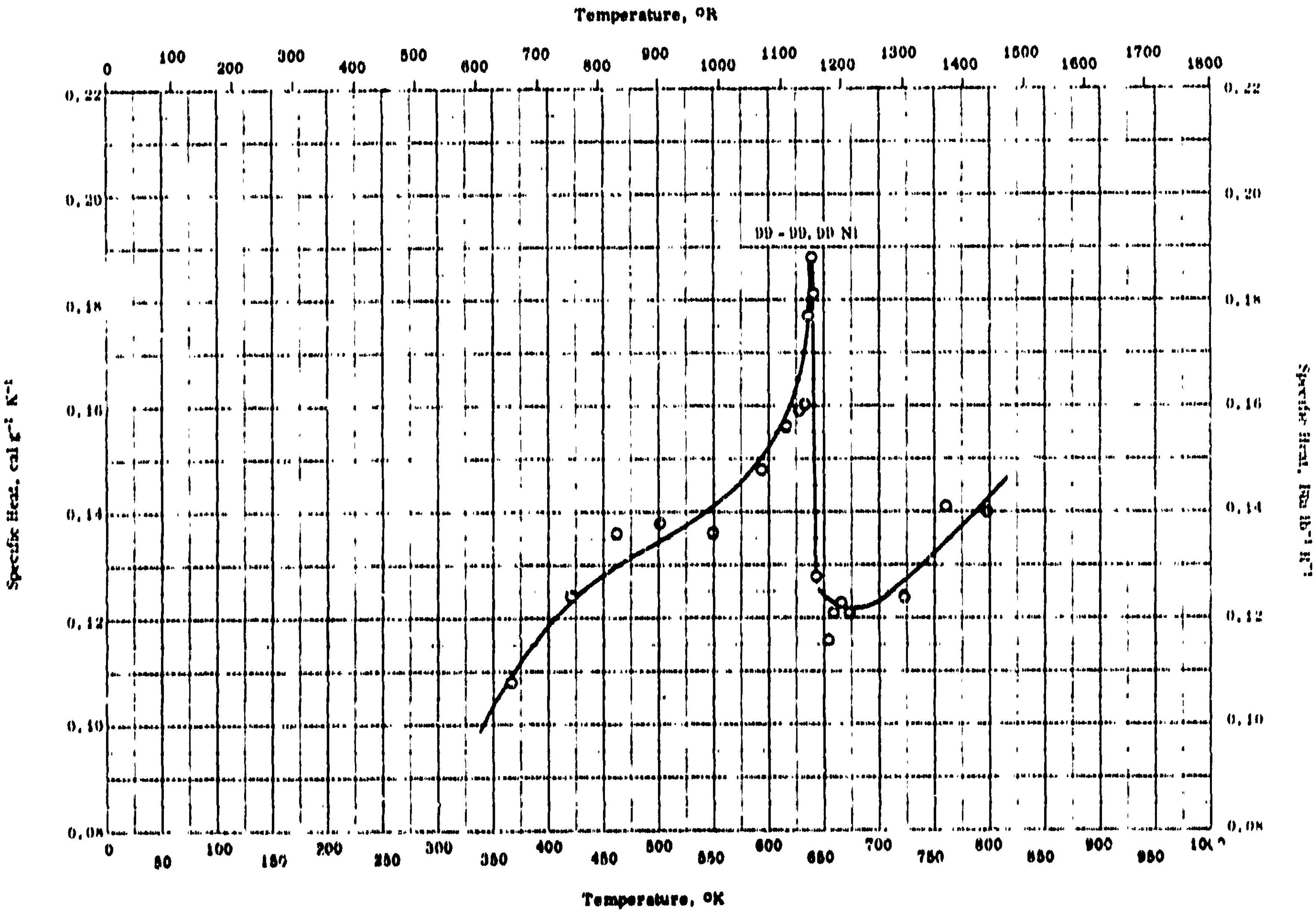


ELECTRICAL RESISTIVITY -- NICKEL + ΣX_i

ELECTRICAL RESISTIVITY -- NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	56-18	273-923		98.70 Ni + Co, 0.30 Fe, 0.27 Mn, 0.20 Cu, 0.18 Mg, 0.17 C, 0.14 SiO_2, and 0.04 S.	Cast, rolled at 1150 C, annealed at 900 C, and then cold-drawn, final annealed at 700 C.



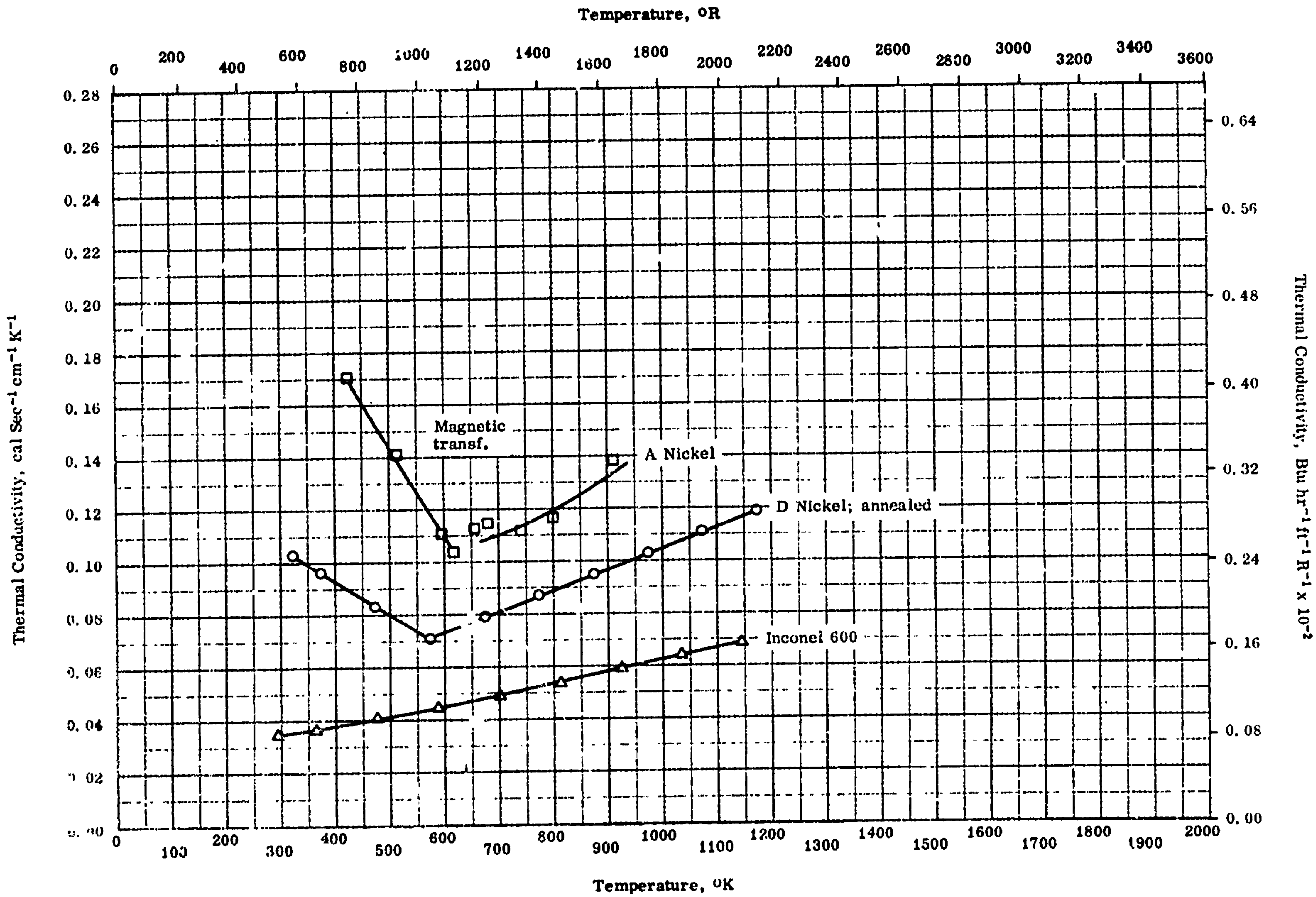
SPECIFIC HEAT -- NICKEL - ΣN_1

SPECIFIC HEAT -- NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	55-19	367-797		0.01 - 1.0 Co, Cu, Fe, and Mn.	

Temperature, °R

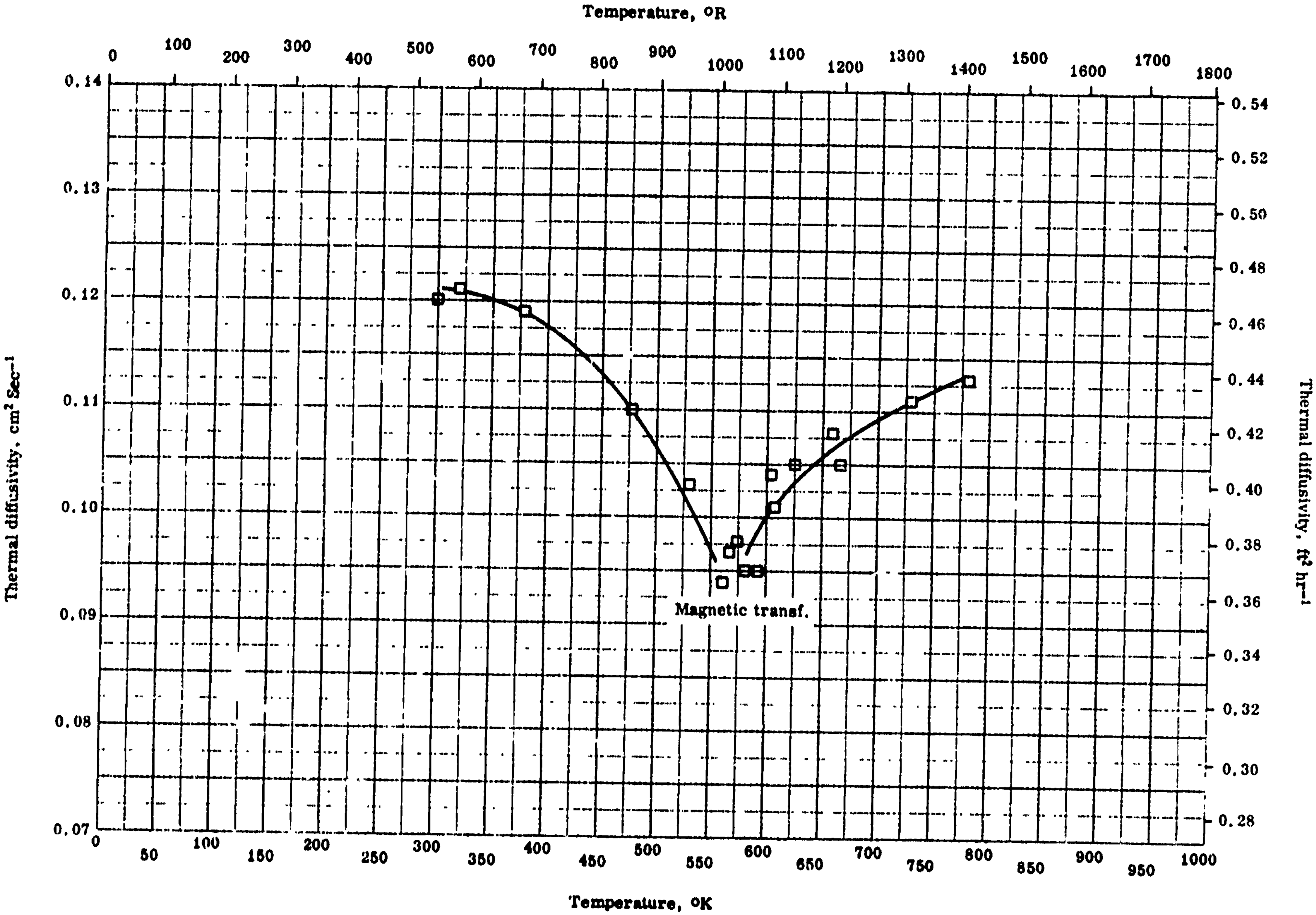


THERMAL CONDUCTIVITY -- NICKEL + ΣX_i

THERMAL CONDUCTIVITY -- NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	53-2	323-1173	2	D Nickel; 92.79 Ni, 4.35 Mn, 1.35 Fe, 1.27 Co, 0.158 C and 0.06 Si.	Annealed at 900 C.
□	54-2	423-910	5-19	A Nickel; 99.542 Ni, 0.3 Si, 0.25 Mn, 0.2 Ti, 0.068 Fe, 0.034 Co, 0.034 Mg, and traces of Cu, Al, B, Ca, and Cr.	
△	62-7	294-1144		Inconel 600 73.55 Ni + Co, 16 Cr, 7.55 Fe, 2.30 Nb + Ta, 0.3 Si, 0.2 Mn, 0.04 C, 0.03 Cu, and 0.005 S.	

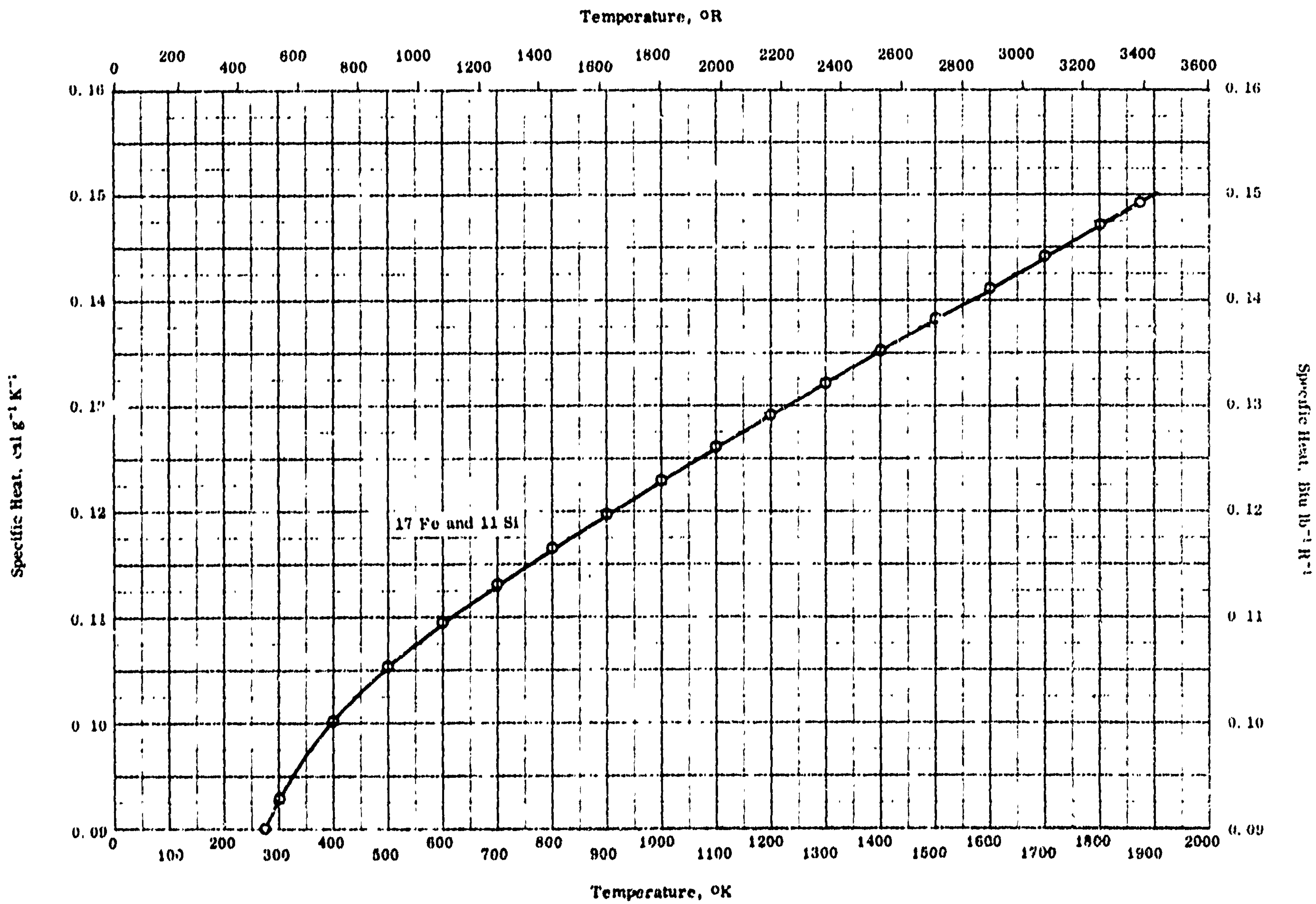


THERMAL DIFFUSIVITY -- NICKEL + ΣX_i

THERMAL DIFFUSIVITY -- NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	53-1	298-780		97.92 Ni, Mn and Si major impurities, and trace Co, Fe, and Mg; by spectrographic analysis.	



SPECIFIC HEAT -- NIOBIUM + IRON + ΣX_i

SPECIFIC HEAT -- NIOBIUM + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	61-19	273-1873	0.8-1.2	Ferroniobium; 58.66 Nb, 17.09 Fe, 10.91 Si, 7.41 Ti, 3.34 Al, 1.17 Zr, 0.53 Cr, 0.042 P, 0.011 Cu, and 0.011 S.	

PROPERTIES OF NIOBIUM - MOLYBDENUM - ΣX_i

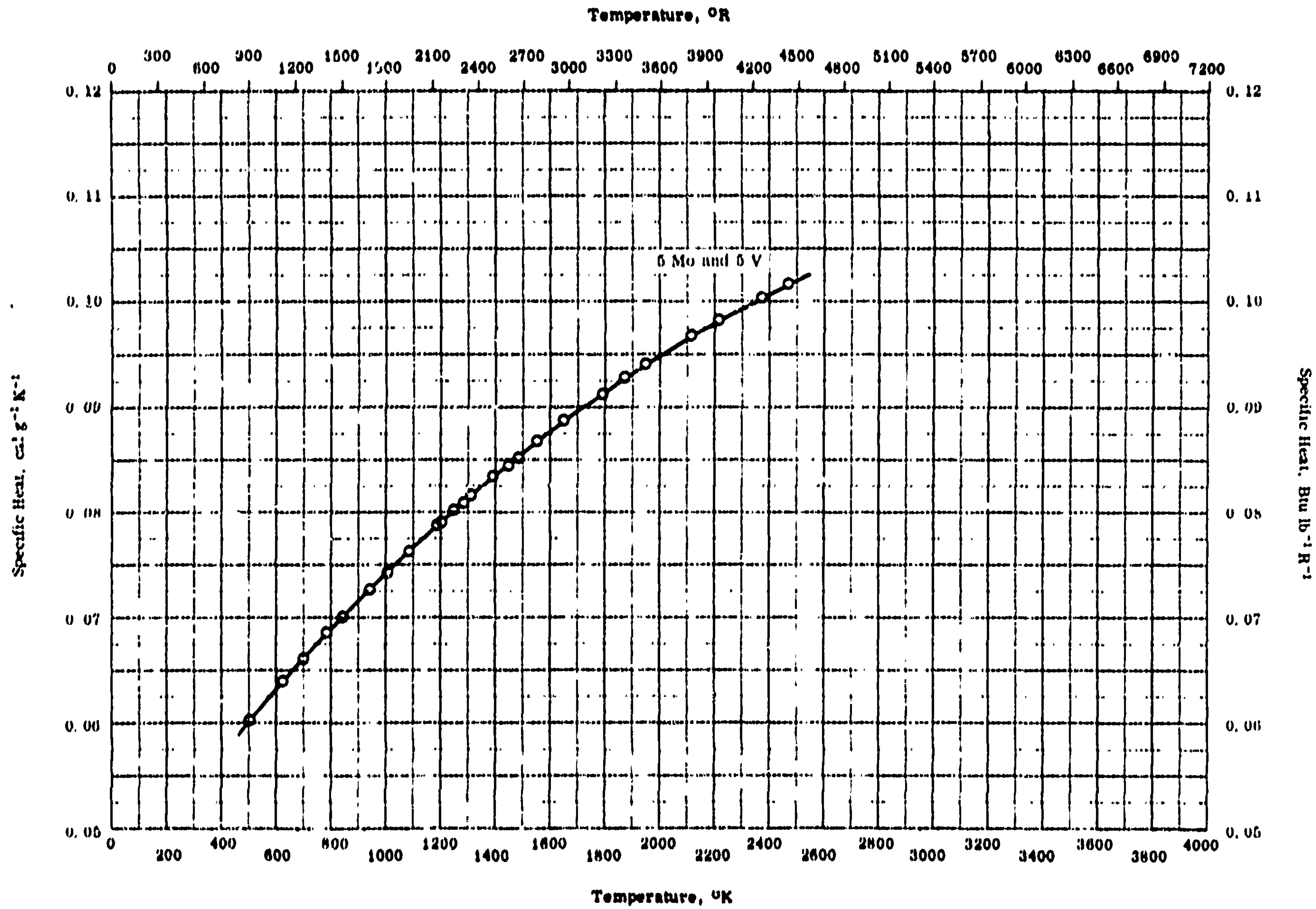
REPORTED VALUES

Density	$g\ cm^{-3}$	$lb\ ft^{-3}$
○ 10 Mo and 10 Ti	7.25	453
□ 20 Mo and 10 Ti	7.37	460
△ 30 Mo and 10 Ti	7.55	471
▽ 20 Mo and 20 Ti	6.85	428
◇ 40 Mo and 10 Ti	7.35	459
● 30 Mo and 20 Ti	6.90	431
■ 40 Mo and 20 Ti	6.80	425
▲ 30 Mo and 30 Ti	6.50	406

PROPERTIES OF NIOBIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-22	298		80 Nb, 10 Mo, and 10 Ti; prepared from 98.9 Nb (1.0 Ta, 0.05 Ti, 0.03 S, 0.02 C, and 0.01 Fe) 99.9 Mo, and 99.5 Ti (0.1 Ni, 0.058 N_2, 0.042 Si, and 0.04 C).	Pressed at 4 ton cm^{-2} from powders, vacuum baked 5 hrs each at 400 C, 600 C, and 800 C, 25 hrs at 1000 C and 12 hrs at 1700-1800 C; value 5-7% lower than theoretical.
□	58-22	298		70 Nb, 20 Mo, and 10 Ti; same as above.	Same as above.
△	58-22	298		60 Nb, 30 Mo, and 10 Ti; same as above.	Same as above.
▽	58-22	298		60 Nb, 20 Mo, and 20 Ti; same as above.	Same as above.
◇	58-22	298		50 Nb, 40 Mo, and 10 Ti; same as above.	Same as above.
●	58-22	298		50 Nb, 30 Mo, and 20 Ti; same as above.	Same as above.
■	58-22	298		40 Nb, 40 Mo, and 20 Ti; same as above.	Same as above.
▲	58-22	298		40 Nb, 30 Mo, and 30 Ti; same as above.	Same as above.

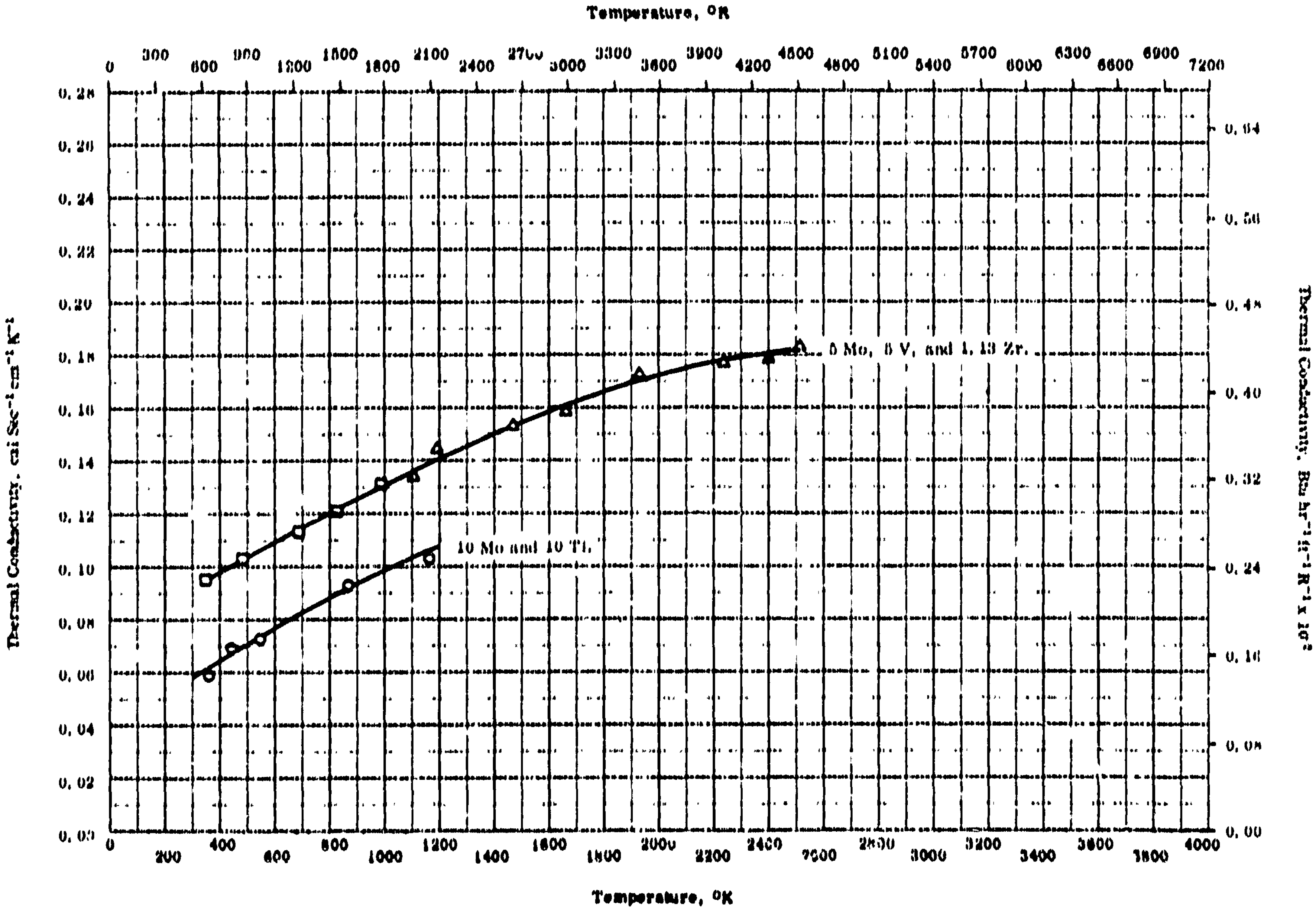


SPECIFIC HEAT -- NIOBIUM + MOLYBDENUM + ΣX_i

SPECIFIC HEAT -- NIOBIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	505-2470	± 5.0	Cb-5Mo-5V-1Zr alloy, 5.03 Mo, 5.02 V, 1.13 Zr, 0.0280 C, 0.0130 N_2, and 0.0093 O_2; density 538 lb ft^{-3}.	

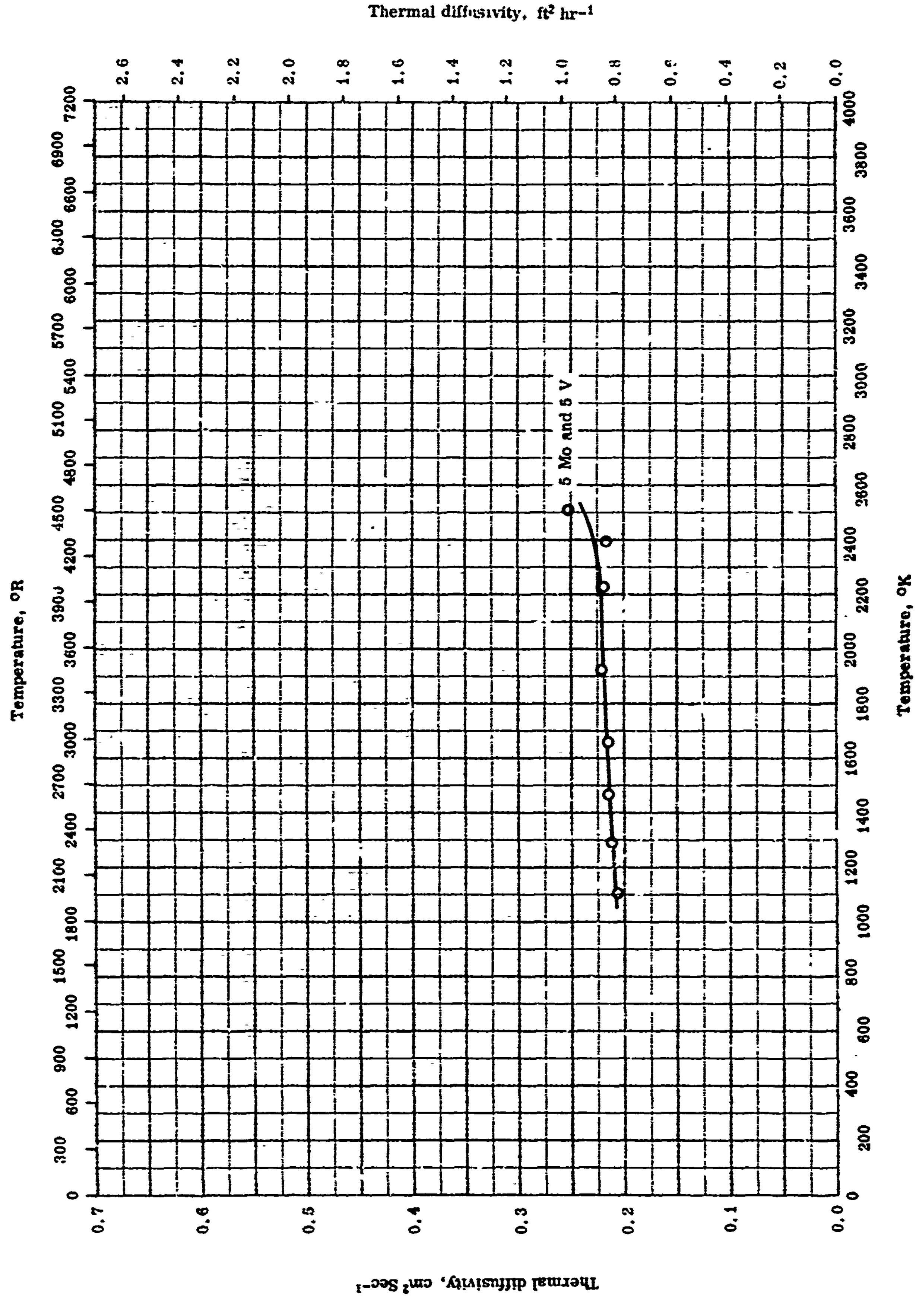


THERMAL CONDUCTIVITY -- NIOBIUM + MOLYBDENUM + ΣX_i

THERMAL CONDUCTIVITY -- NIOBIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-2	361-1161		10 Mo and 10 Ti; nominal composition	
□	63-1	353-983	±4	88.77 Nb, 5.03 Mo, 5.02 V, 1.13 Zr, 0.028 C, 0.0136 N_2, and 0.0093 O_2; density 538 lb ft^{-3}.	End-ground flat and parallel; measured in He atm.
△	63-1	1103-2508	±4	Same as above.	The above sample measured by another method.

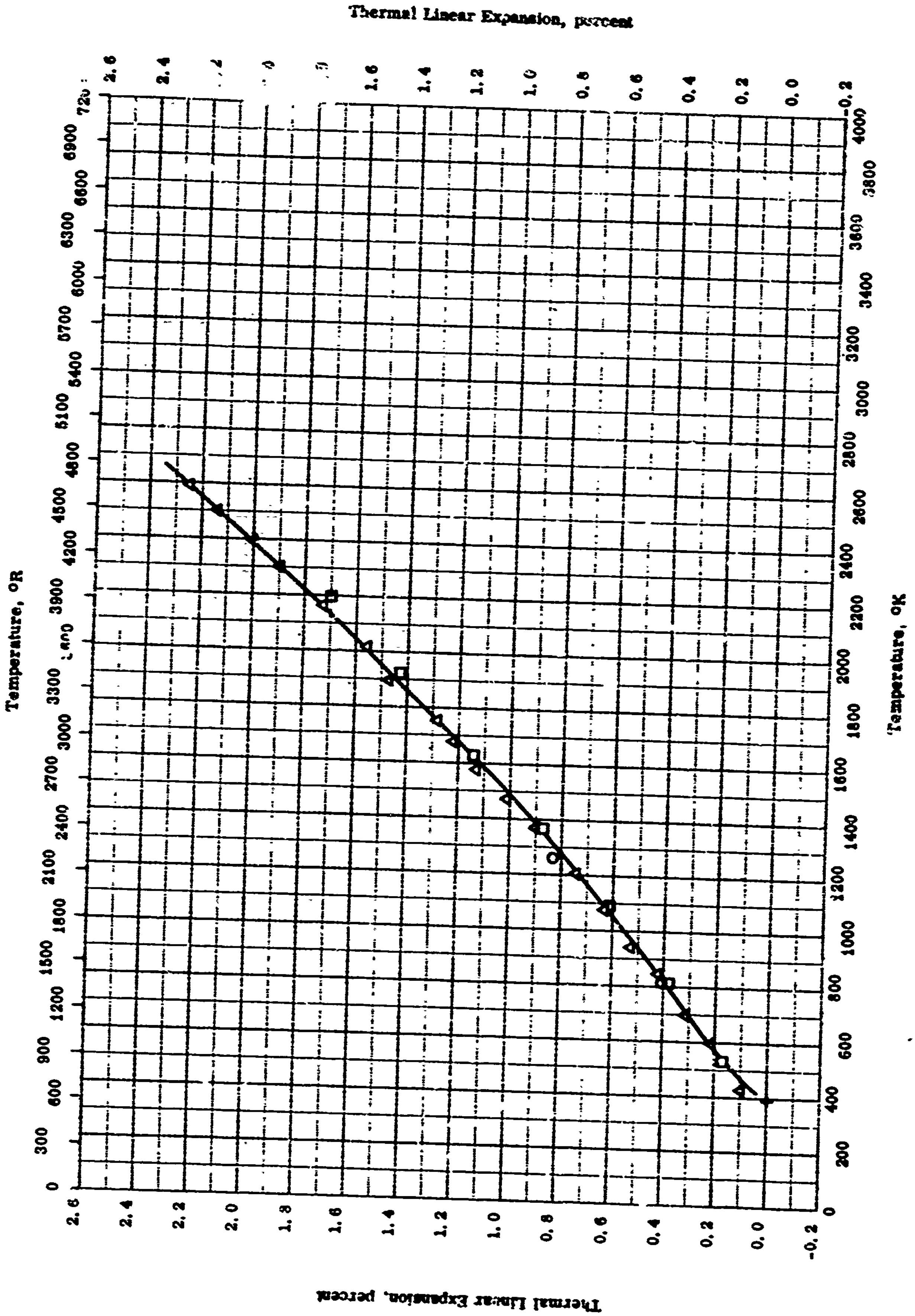


THERMAL DIFFUSIVITY -- NIOBIUM + MOLYBDENUM + ΣX_i

THERMAL DIFFUSIVITY -- NIOBIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-1	1103-2510		Nb-5 Mo-5 V-1 Zr; 5.03 Mo, 5.02 V, 1.13 Zr, 0.0280 C, 0.0136 N_2, and 0.0093 O_2; density 8.61 g cm^{-3}.	Surface ground discs.

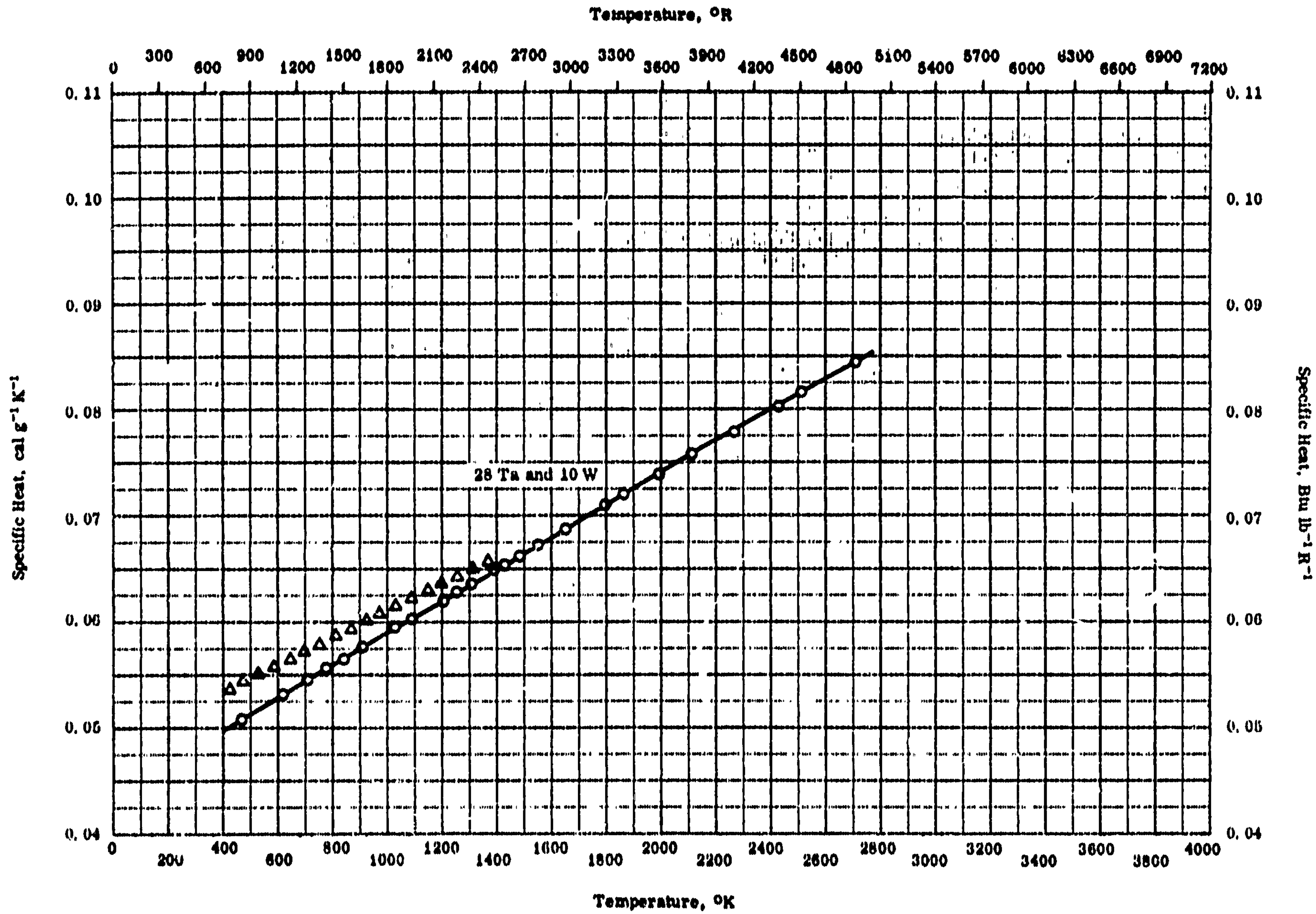


THERMAL LINEAR EXPANSION — NIOBIUM + MOLYBDENUM + ΣX_i

THERMAL LINEAR EXPANSION -- NIOBIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-18	300-1633	<5	10 Mo and 10 Ti.	Double arc-melted in vacuum by E.I. du Pont de Nemours and Co., extruded in air and in argon to 2400-2500 F, recrystallized at 2300 F for 1 hr in an inert atm, and then machined into 3/8 in. dia by 3 in. long specimen by Thompson Products Incorporated.
□	62-26	298-2198		B-66 niobium-base alloy, nominal: 5.0 Mo, 5.0 V, 1.0 Zr, 0.012 O, 0.006 C and 0.006 N; density 0.305 lb in^{-3} and M. P. 4300 F.	
△	63-1	300-2586	2	Westinghouse Electric Corp; 88.77 Nb, 5.03 Mo, 5.02 V, 1.13 Zr, 0.028 C, 0.0136 N and 0.0093 O; density 538 lb ft^{-3}; specimen dimension 1/2 in. dia by 6 in. long.	Measured in argon with heating rate of approx 5 F min^{-1}.

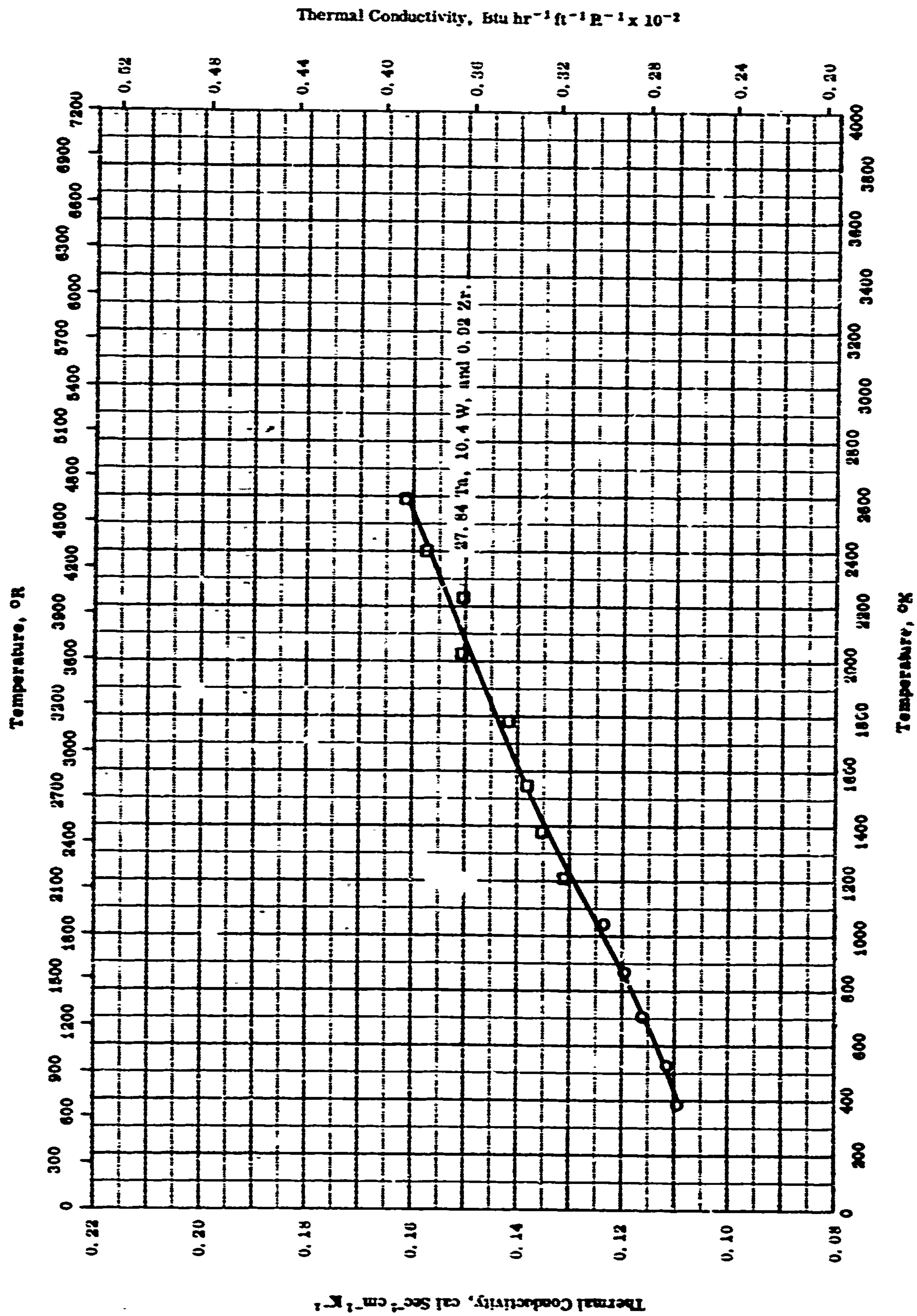


SPECIFIC HEAT -- NIOBIUM + TANTALUM + ΣXi

SPECIFIC HEAT -- NIOBIUM + TANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	472-2700	± 5.0	Cb-27Ta-12W-0.5Zr alloy; 27.84 Ta, 10.40 W, 0.92 Zr, 0.01 Si, 0.009 Ni, 0.007 Fe, 0.005 Ti, 0.0050 O_2, 0.0040 C, and 0.0020 N_2; density 669 lb ft^{-3}.	
△	61-20	422-1304		FS-82B alloy; 33 Ta and 0.7-1.0 Zr.	

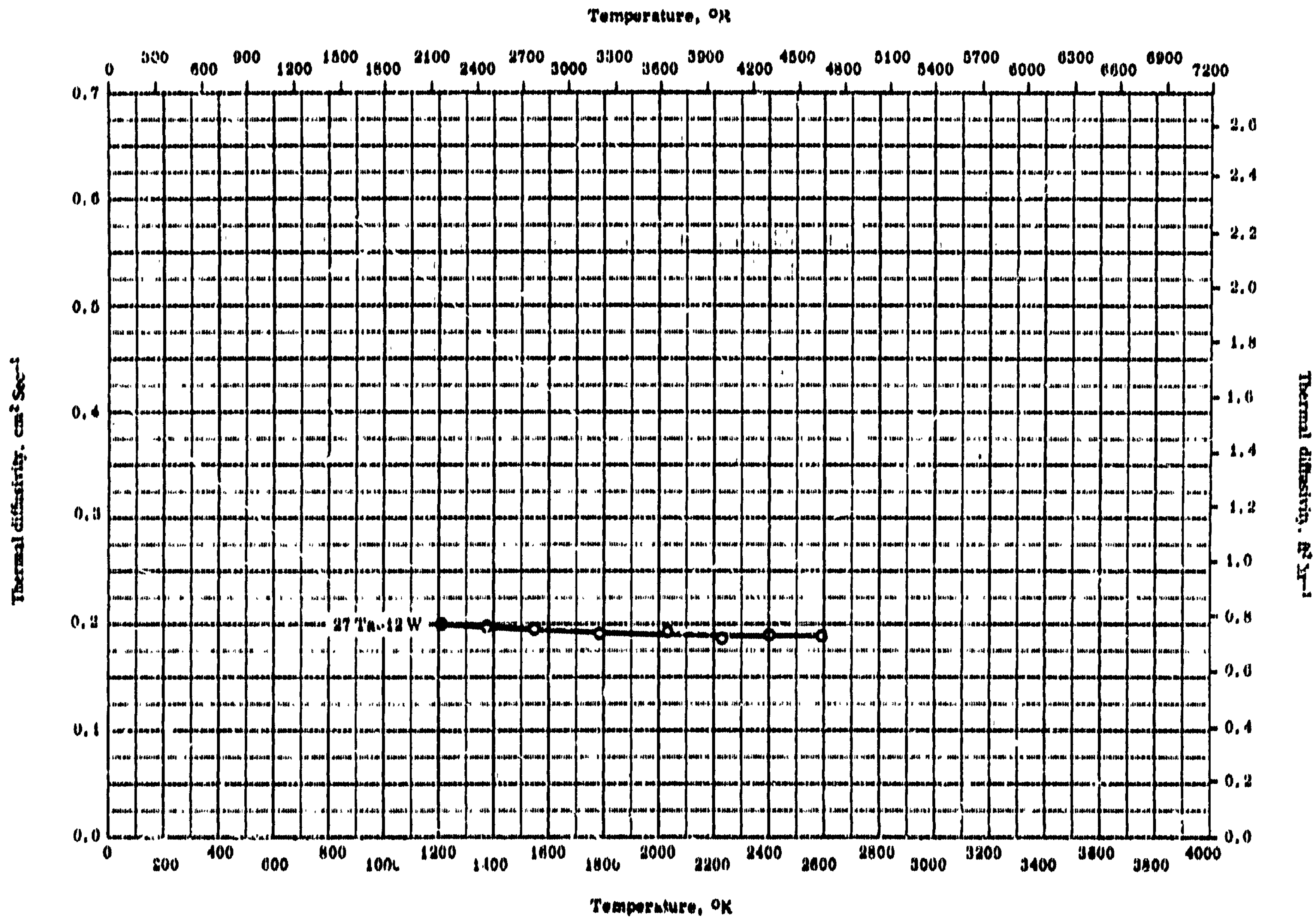


THERMAL CONDUCTIVITY -- NIOBIUM + TANTALUM + ΣX_i

THERMAL CONDUCTIVITY -- NIOBIUM + TANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	386-1044	±4	60.8 Nb, 27.84 Ta, 10.40 W, 0.02 Zr, 0.01 Si, 0.009 Ni, 0.007 Fe, 0.005 Ti, 0.0050 O_2, 0.0040 C, and 0.0020 N_2; density 669 lb ft^{-3}.	End-ground flat and parallel; measured in He atm.
□	63-1	1208-2602	±4	Same as above.	The above sample measured by another method.

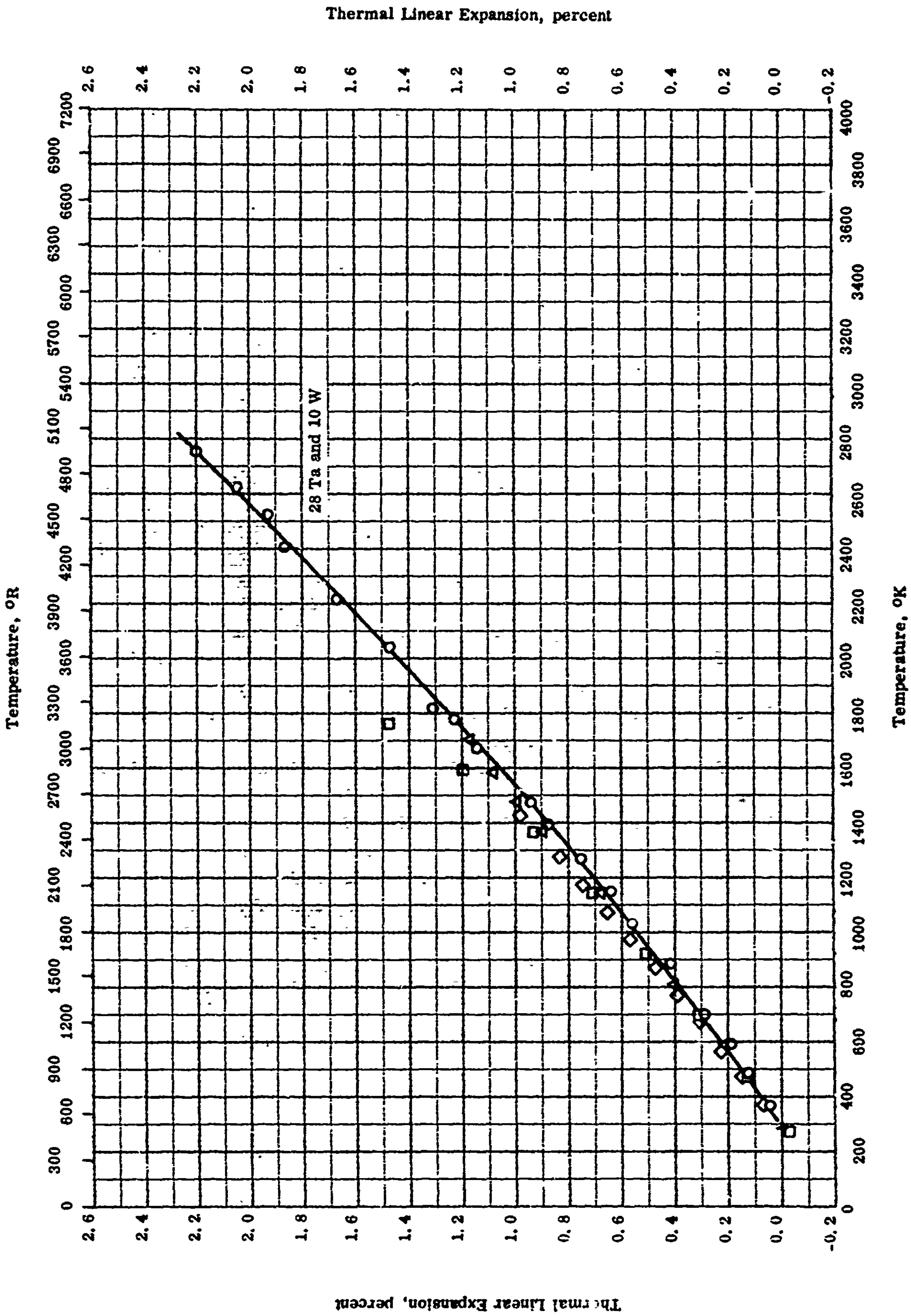


THERMAL DIFFUSIVITY -- NIOBIUM + TANTALUM + ΣX_i

THERMAL DIFFUSIVITY — NIOBIUM + TANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
⊃	63-1	1208-2594		Nb-27 Ta-12 W-0.5 Zr; 27.84 Ta, 10.40 W, 0.92 Zr, 0.01 Si, 0.009 Ni, 0.007 Fe, 0.005 Ti, 0.0050 O_2, 0.0040 C, and 0.0020 N_2; density 10.72 g cm^{-3}.	



THERMAL LINEAR EXPANSION -- NIOBIUM + TANTALUM + ΣX_i

THERMAL LINEAR EXPANSION -- NIOBIUM + TANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	300-2747	2	Fansteel Metallurgical Corp.; 60.8 Nb, 27.84 Ta, 10.40 W, 0.92 Zr, 0.01 Si, 0.009 Ni, 0.007 Fe, 0.005 Ti, 0.005 O, 0.004 C, and 0.002 N; density 669 lb ft^{-3}; specimen dimension 1/2 in. dia by 6 in. long.	Measured in argon atmosphere with heating rate of 5 F per min.
□	ND-1	273-1761		FS 85; 26-29 Ta, 10-12 W, 0.6-1.1 Zr, 0.0300 max O, 0.0150 max N, 0.0100 max C, Fe, Si each, and 0.0010 max H; density 10.6 g cm^{-3} and melting point 4695 F.	
△	61-27	297-1700		FS 82; 0.040 gage alloy sheet obtained from Fansteel Metallurgical Corp.; 33 Ta and 0.7 Zr.	Stress relieved 1 hr at 1900 F.
◇	61-20	298-1423		FS 82B.	Tested in argon.

PROPERTIES OF NIOBIUM + TITANIUM + ΣX_i

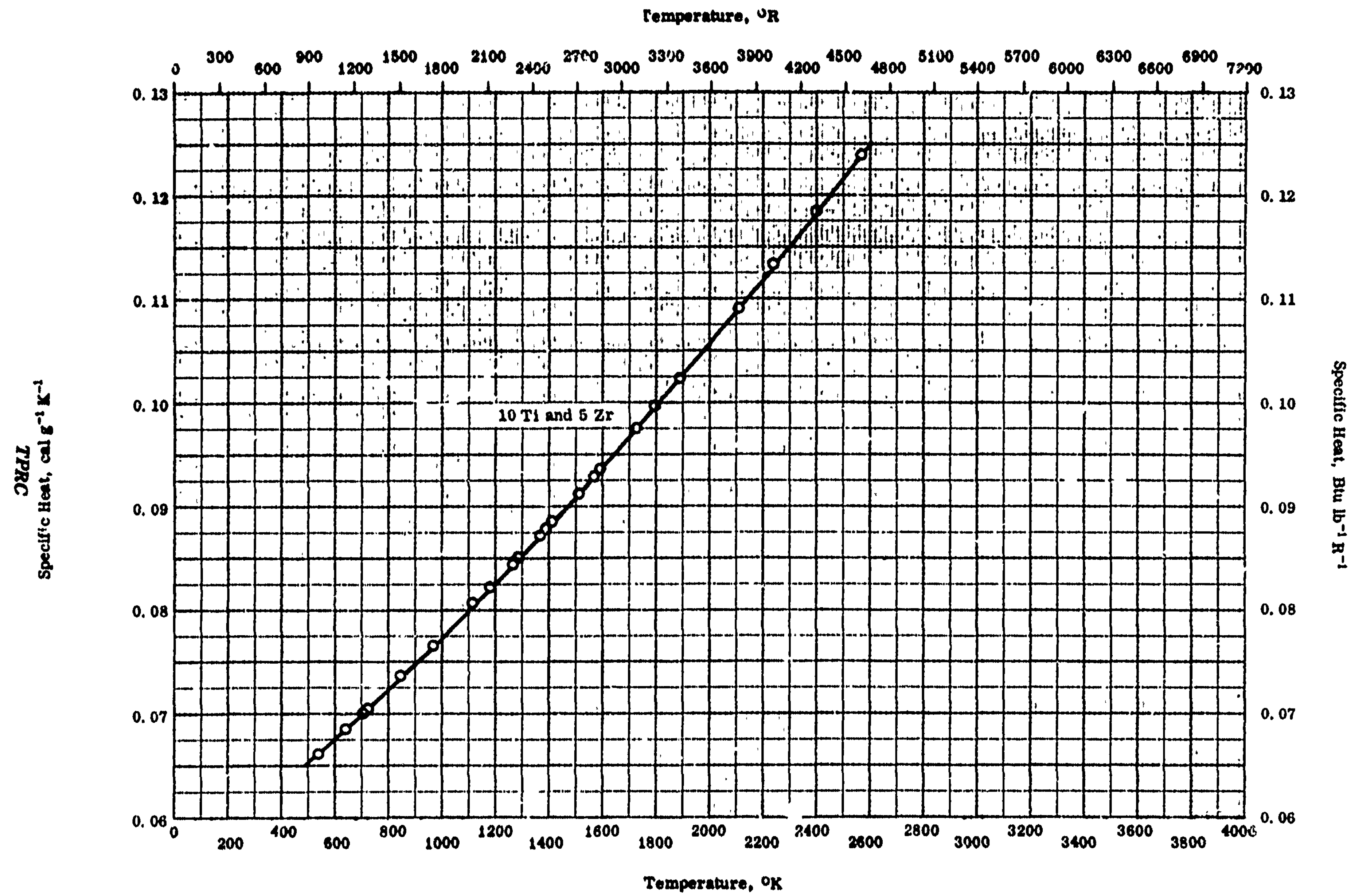
REPORTED VALUES

Density:		$g\ cm^{-3}$	$lb\ ft^{-3}$
○	10 Ti and 10 Mo	7.25	453
□	20 Ti and 10 Mo	6.74	421
△	30 Ti and 10 Mo	6.12	382
▽	20 Ti and 20 Mo	6.85	428
◇	40 Ti and 10 Mo	5.12	320
●	30 Ti and 20 Mo	6.3	393
■	40 Ti and 20 Mo	6.15	384
▲	30 Ti and 30 Mo	6.50	406

PROPERTIES OF NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-22	298		80 Nb, 10 Ti, and 10 Mo; prepared from 98.9 Nb (1.0 Te, 0.05 Ti, 0.03 S, 0.02 C, and 0.01 Fe), 99.9 Mo, and 99.5 Ti (0.1 Ni, 0.058 N_2, 0.042 Si, and 0.04 C).	Pressed at 4 ton cm^{-2} from powders; vacuum sintered 5 hrs each at 400 C, 600 C, 800 C, and 25 hrs at 1000 C, and 12 hrs at 1700-1800 C; value 5-7% lower than theoretical.
□	58-22	298		70 Nb, 20 Ti, and 10 Mo; same as above.	Same as above.
△	58-22	298		60 Nb, 30 Ti, and 10 Mo; same as above.	Same as above.
▽	58-22	298		60 Nb, 20 Ti, and 20 Mo; same as above.	Same as above.
◇	58-22	298		50 Nb, 40 Ti, and 10 Mo; same as above.	Same as above.
●	58-22	298		50 Nb, 30 Ti, and 20 Mo; same as above.	Same as above.
■	58-22	298		40 Nb, 40 Ti, and 20 Mo; same as above.	Same as above.
▲	58-22	298		40 Nb, 30 Ti, and 30 Mo; same as above.	Same as above.

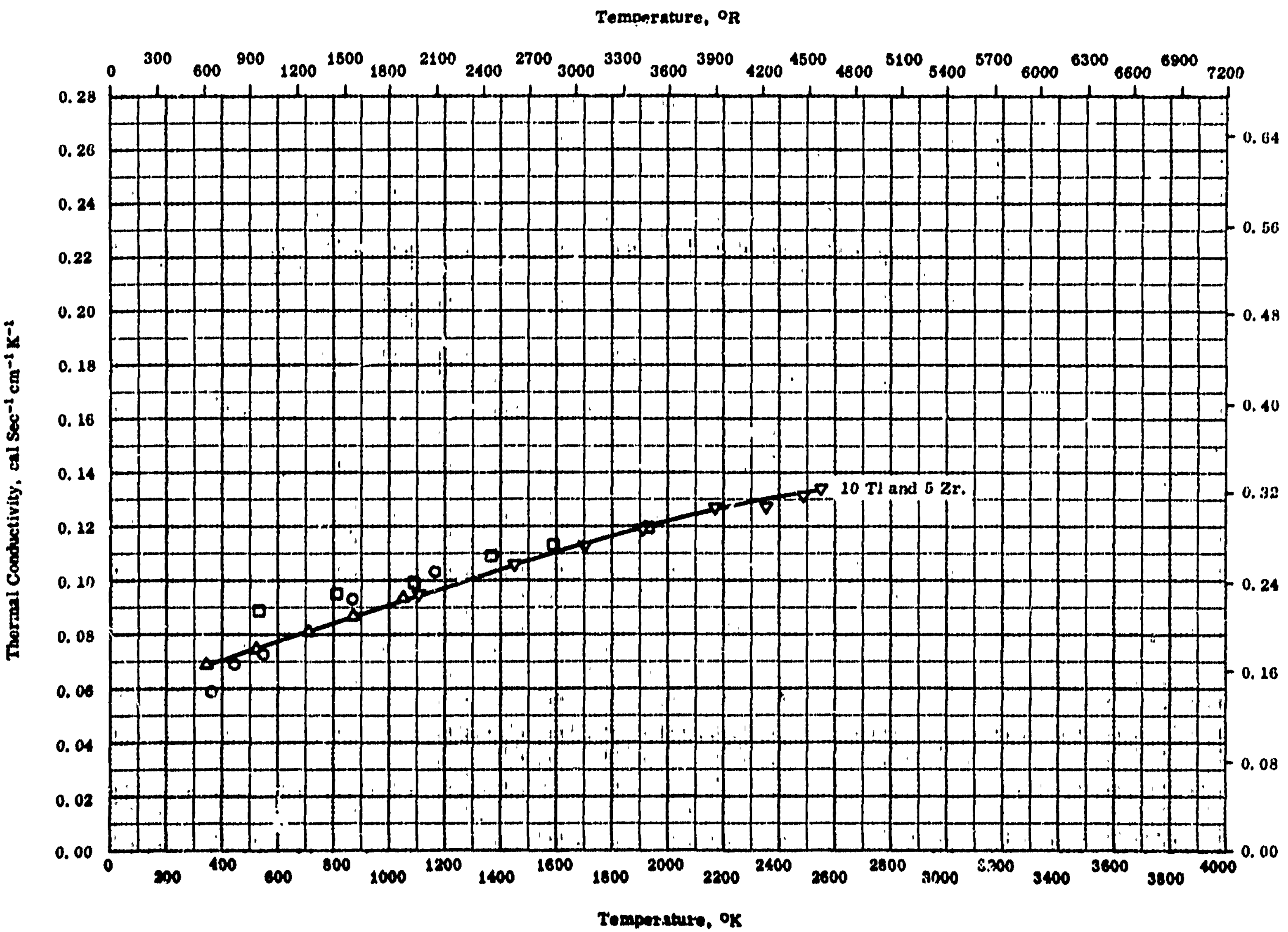


SPECIFIC HEAT -- NIOBIUM + TITANIUM + ΣX_i

SPECIFIC HEAT -- NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	542-2560	5.0	Cb - 10 Ti - 5 Zr alloy; 10.0 Ti, 4.9 Zr, 0.0244 O_2, 0.0024 N_2, 0.0014 C, and 0.0014 H_2; density 485 lb ft^{-3}.	

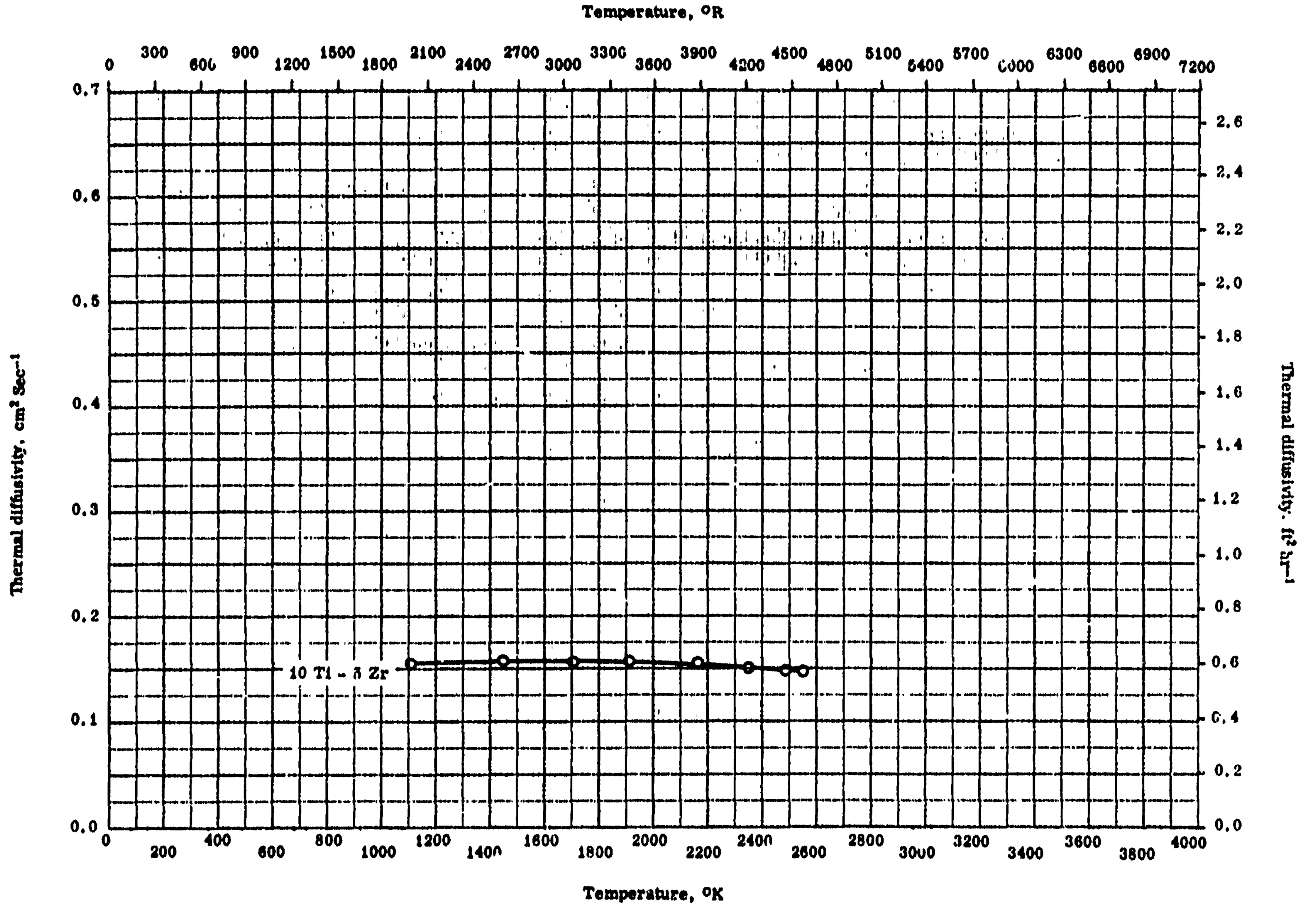


THERMAL CONDUCTIVITY -- NIOBIUM + TITANIUM + ΣX_i

THERMAL CONDUCTIVITY -- NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-2	361-1161		10 Ti and 10 Mo; nominal composition.	
□	62-3	533-1922		10 Ti and 5 Zr; nominal composition.	
△	63-1	342-1053	±4	83.96 Nb, 10.5 Ti, 5.5 Zr, 0.0249 O_2, 0.0071 C, 0.0027 N_2, and 0.0009 H_2; density 485 lb ft^{-3}.	End surfaces ground flat and parallel; measured in a He atm.
▽	63-1	1105-2544	±4	Same as above.	The above sample measured by another method.

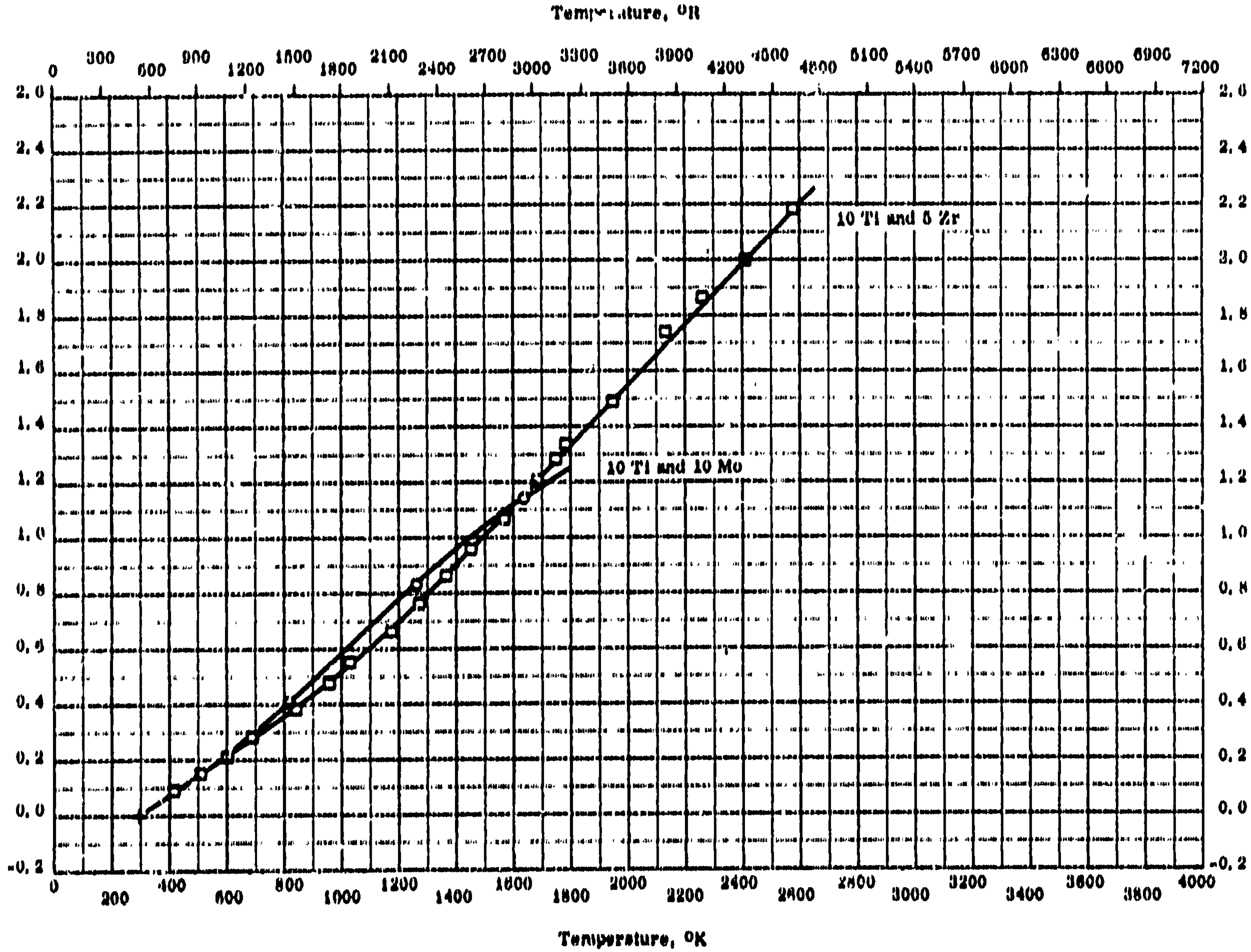


THERMAL DIFFUSIVITY -- NIOBIUM + TITANIUM + ΣX_i

THERMAL DIFFUSIVITY -- NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-1	1205-2546		Nb-10 Ti-5 Zr; 10.5 Ti, 5.5 Zr, 0.0249 O_2, 0.0071 C, 0.0037 N_2, and 0.0009 H_2; density 7.77 g cm^{-3}.	Surface ground discs.

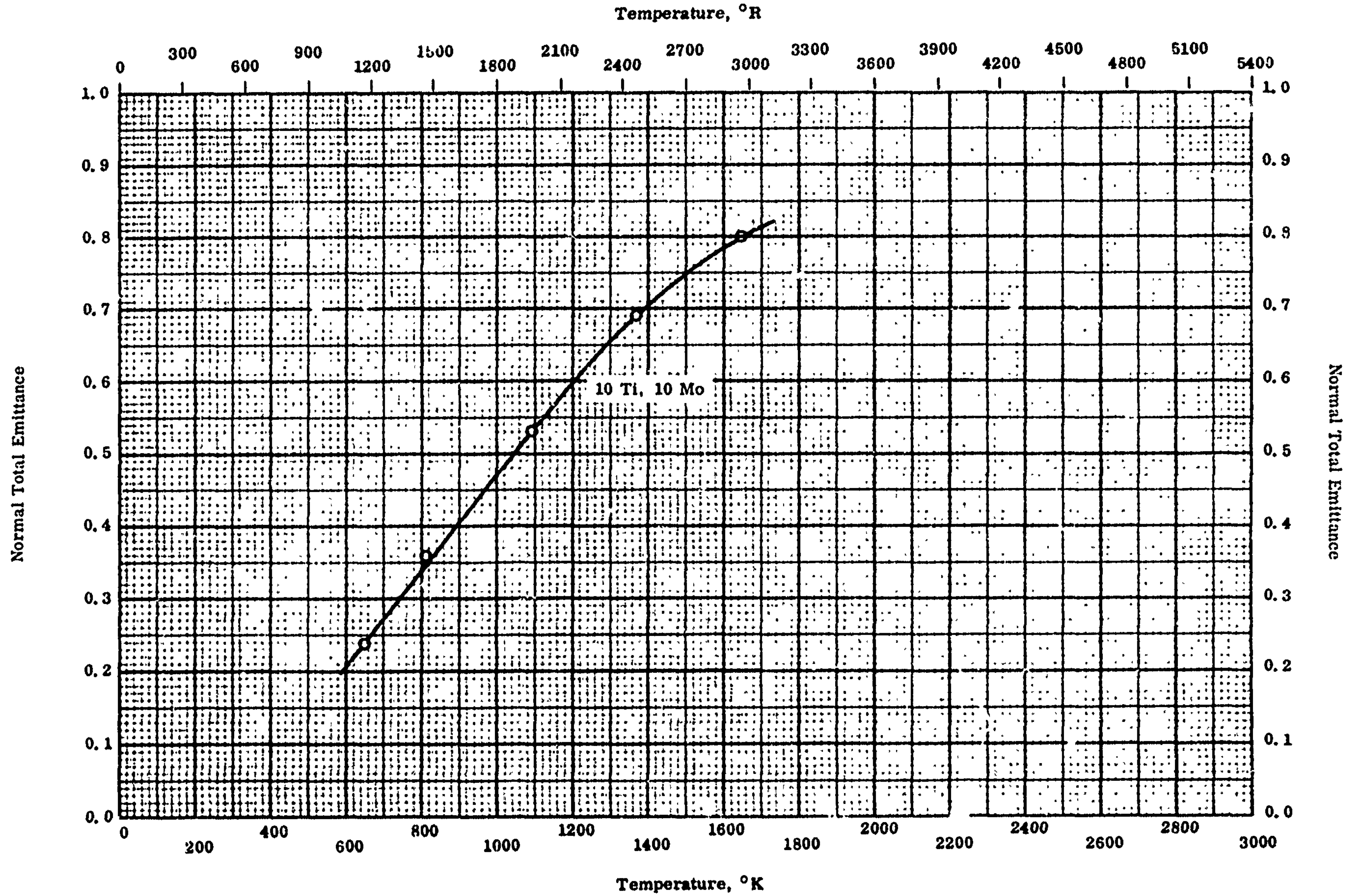


THERMAL LINEAR EXPANSION -- NIOBIUM + TITANIUM + ΣX_i

THERMAL LINEAR EXPANSION -- NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-18	298-1633	<5	10 Ti and 10 Mo.	Double arc-melted in vacuum by E.I. de Pont de Nemours and Co., extruded in air and in argon to 2400-2500 F, recrystallized at 2300 F for 1 hr in an inert atmosphere, and then machined into 3/8 i diameter by 3 in. long specimen by Thompson Products Incorp.
□	63-1	300-2577	2	DuPont; 85.08 Nb, 10.0 Ti, 4.9 Zr, 0.0244 O, 0.0014 C, 0.0024 N, and 0.0014 H; specimen dimension 1/2 in. dia by 8 in. long.	Measured in argon with heating rate of approx 5 F per min.

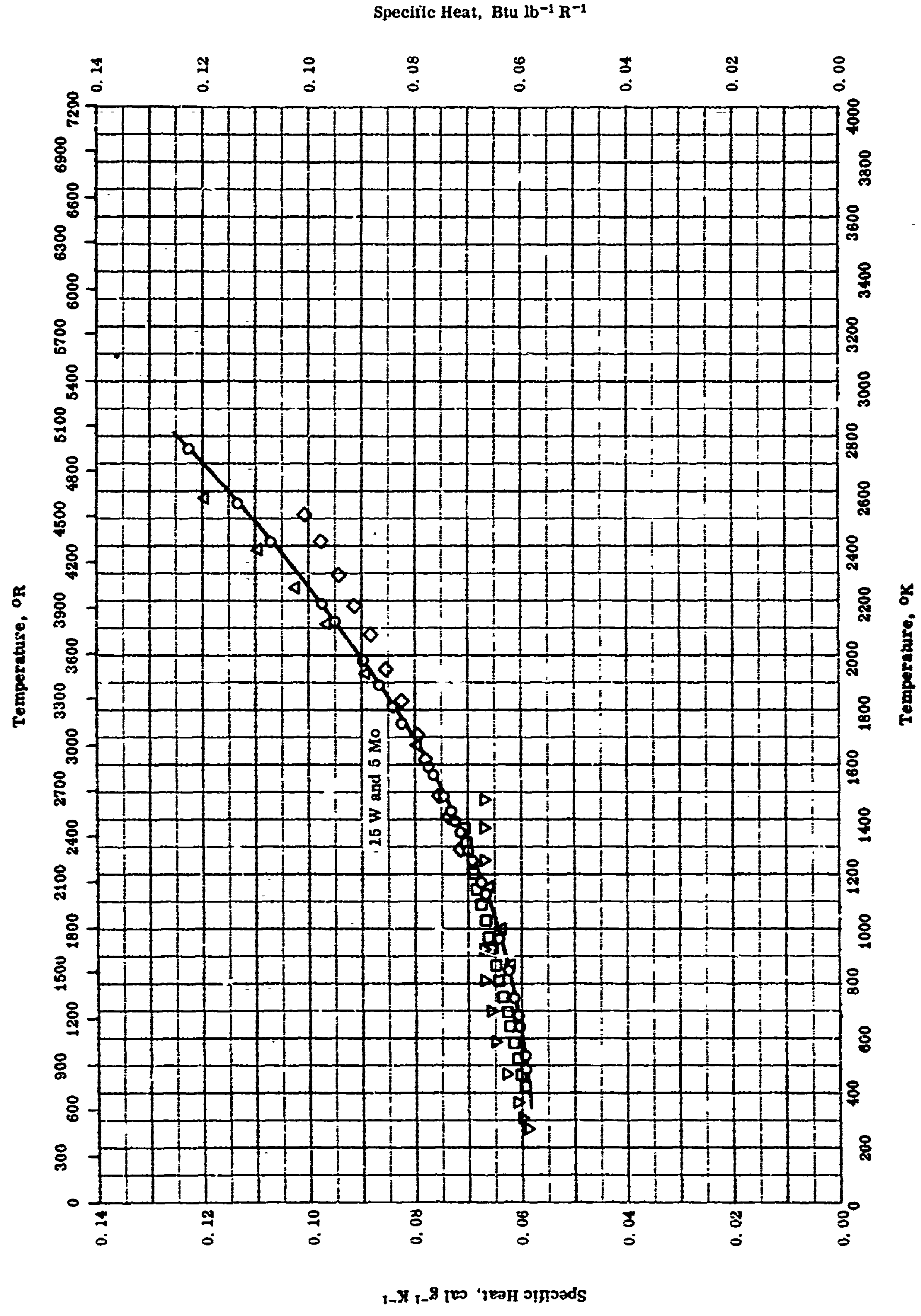


NORMAL TOTAL EMITTANCE -- NIOBIUM + TITANIUM + ΣX_i

NORMAL TOTAL EMITTANCE -- NIOBIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-18	644-1644	± 20	10 Ti, and 10 Mo; surface finish 63.	Measured in helium.

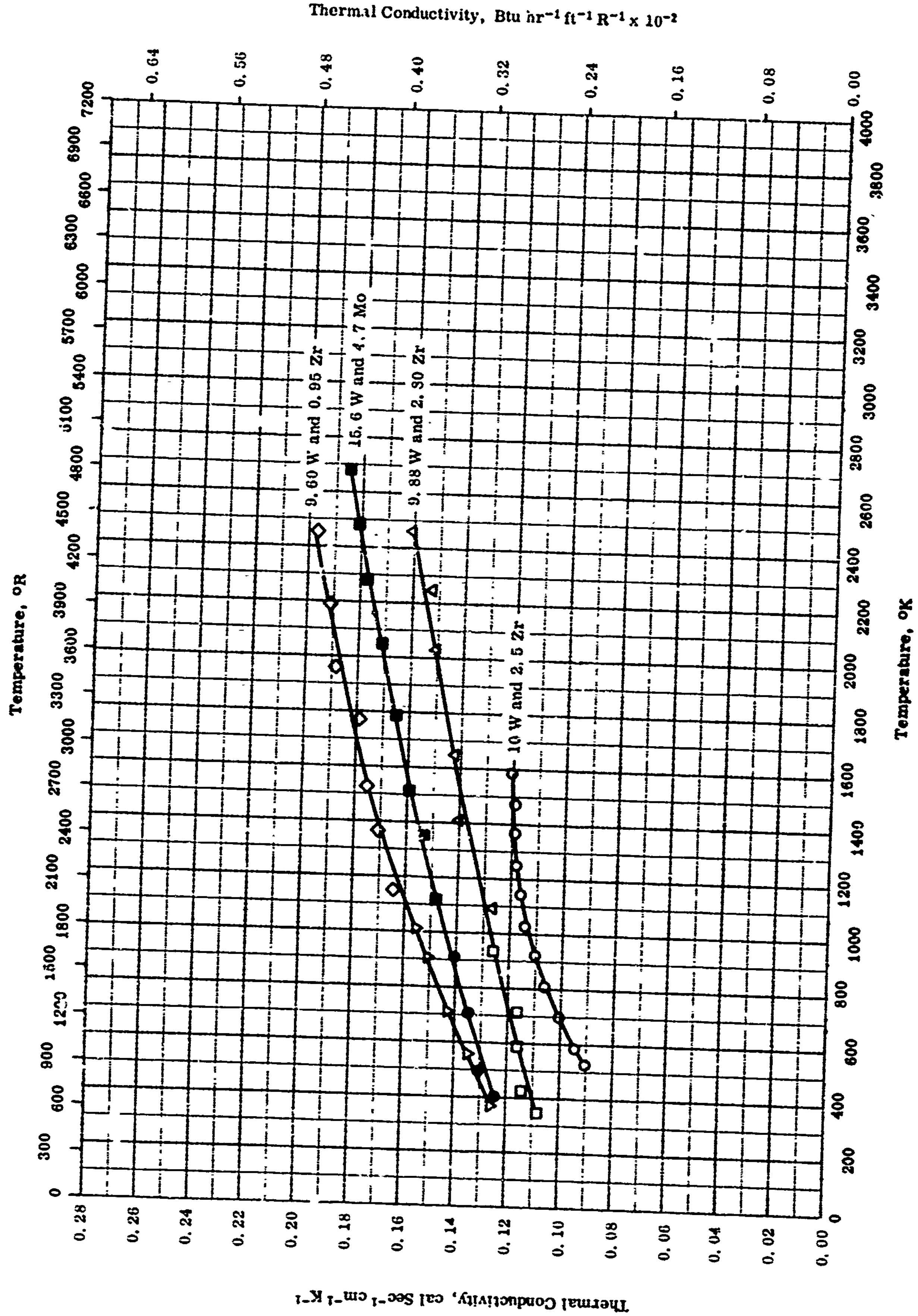


SPECIFIC HEAT -- NIOBIUM + TUNGSTEN + ΣX_i

SPECIFIC HEAT -- NIOBIUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	487-2740	±5.0	Cb - 15 W - 5 Mo - 1 Zr - 0.05 C alloy; 15.3 W, 5.26 Mo, 1.08 Zr, 0.0340 C, 0.0211 N_2, 0.0167 O_2, and 0.0061 H_2.	
□	61-20	422-1366		F - 48 alloy; 13.8 W, 4.8 Mo, 0.90 Zr, 0.041 C, 0.036 O_2, and 0.01[illegible] N_2.	Heat treated.
△	63-1	550-2570	±5.0	Cb - 10W - 5 Zr alloy; 9.93 W, 2.58 Zr, 0.0120 O_2, 0.0060 N_2, 0.0020 C, and 0.0009 H_2, density 572 lb ft^{-3}.	
◇	63-1	455-2510	±5.0	Cb - 10 W - 1 Zr - 0.1 C alloy, 9.7 W, 0.88 Zr, 0.0810 C, 0.0052 O_2, 0.0033 N_2, and 0.000 H_2.	
▽	63-5	273-1480	4.0	Cb - 752, 87.5 Nb, 10.0 W, and 2.5 Zr.	

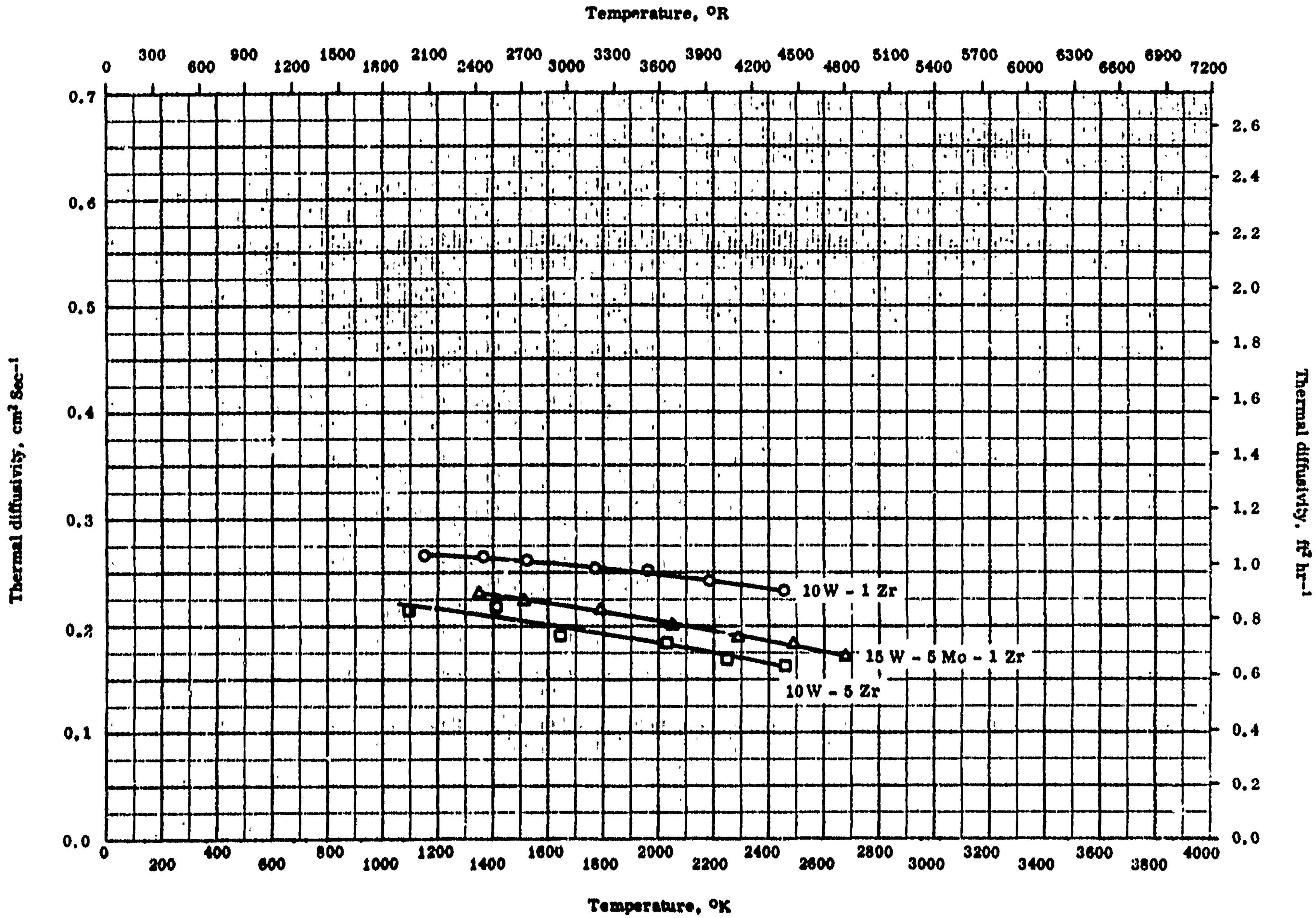


THERMAL CONDUCTIVITY -- NIOBIUM + TUNGSTEN + ΣX_i

THERMAL CONDUCTIVITY -- NIOBIUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-5	533-1590		10 W and 2.5 Zr; nominal composition; density 0.326 lb in^{-3}.	
□	63-1	355-939	±4	87.3 Nb, 9.88 W, 2.80 Zr, 0.0082 O_2, 0.0042 N_2, 0.002 C, and 0.0011 H_2; density 572 lb ft^{-3}.	End surfaces ground flat and parallel; measured in He atm.
△	63-1	1098-2461	±4	Same as above.	The above sample measured by another method.
▽	63-1	372-1011	±4	89.39 Nb, 9.60 W, 0.95 Zr, 0.0510 C, 0.0053 O_2, 0.0033 N_2, and 0.0003 H_2; density 564 lb ft^{-3}.	End surfaces ground flat and parallel; measured in He atm.
◇	63-1	1150-2455	±4	Same as above.	The above sample measured by another method.
●	63-1	405-915	±4	78.78 Nb, 15.6 W, 4.7 Mo, 0.84 Zr, 0.0489 C, 0.0163 O_2, 0.01 Ta, 0.0020 N_2, and 0.0005 H_2; density 599 lb ft^{-3}	End surfaces ground flat and parallel; measured in He atm.
■	63-1	1117-2678	±4	Same as above.	The above sample measured by another method.

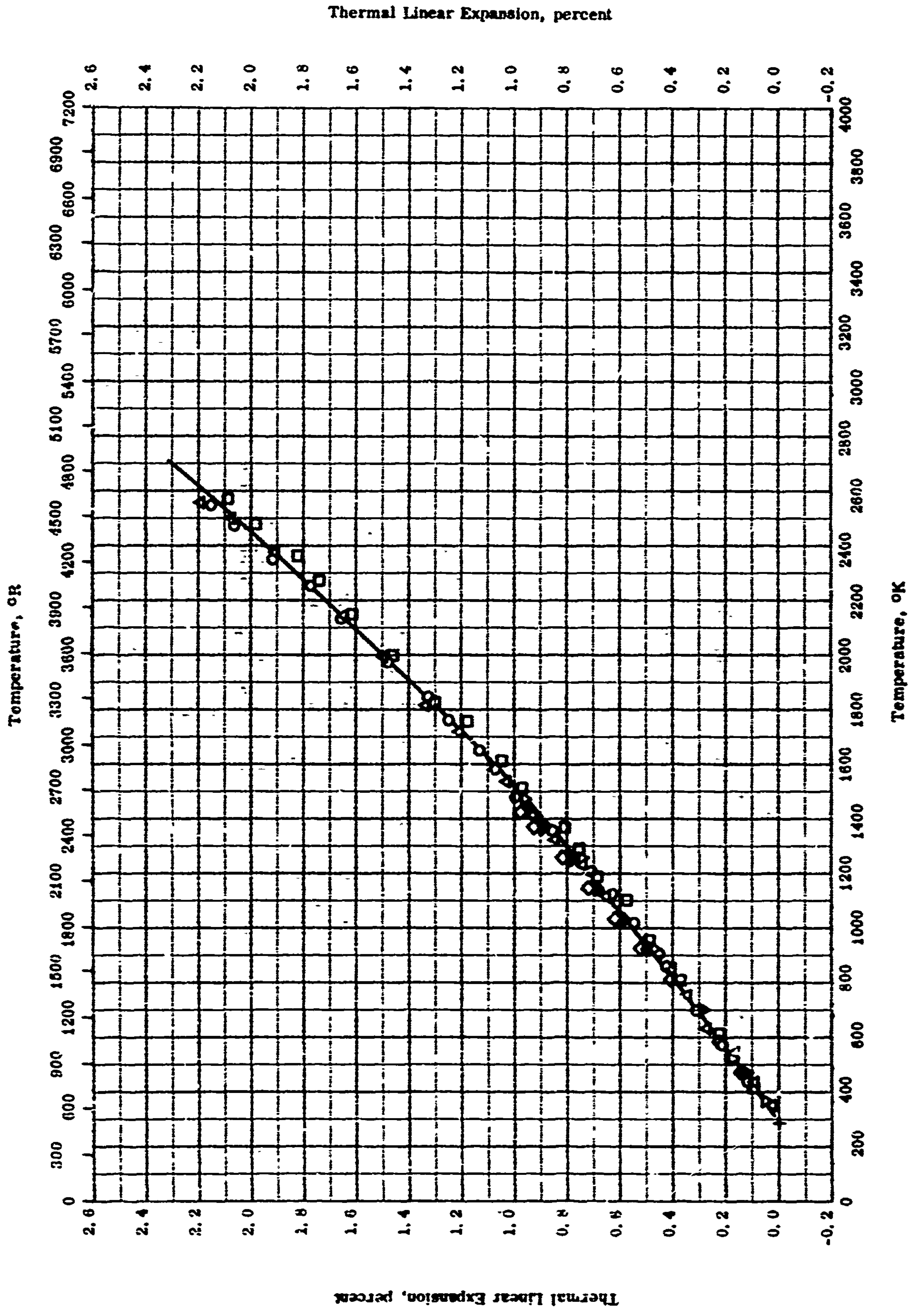


THERMAL DIFFUSIVITY -- NIOBIUM + TUNGSTEN + ΣX_i

THERMAL DIFFUSIVITY -- NIOBIUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	1150-2453		Nb-10 W-1 Zr-0.1 C; 9.6 W, 0.95 Zr, 0.051 C, 0.0053 O_2, 0.033 N_2, and 0.0003 H_2; density 9.04 g cm^{-3}.	Surface ground discs.
□	63-1	1098-2461		Nb-10 W-5 Zr; 9.88 W, 2.80 Zr, 0.0080 O_2, 0.0040 N_2, 0.002 C 0.0011 H_2; density 9.16 g cm^{-3}.	Surface ground discs.
△	63-1	1363-2680		Nb-15 W-5 Mo-1 Zr-0.05 C; 15.6 W, 4.7 Mo, 0.84 Zr, 0.0489 C, 0.0163 O_2, 0.01 Ta, 0.0020 N_2; and 0.0005 H_2; density 9.60 g cm^{-3}.	Surface ground discs.

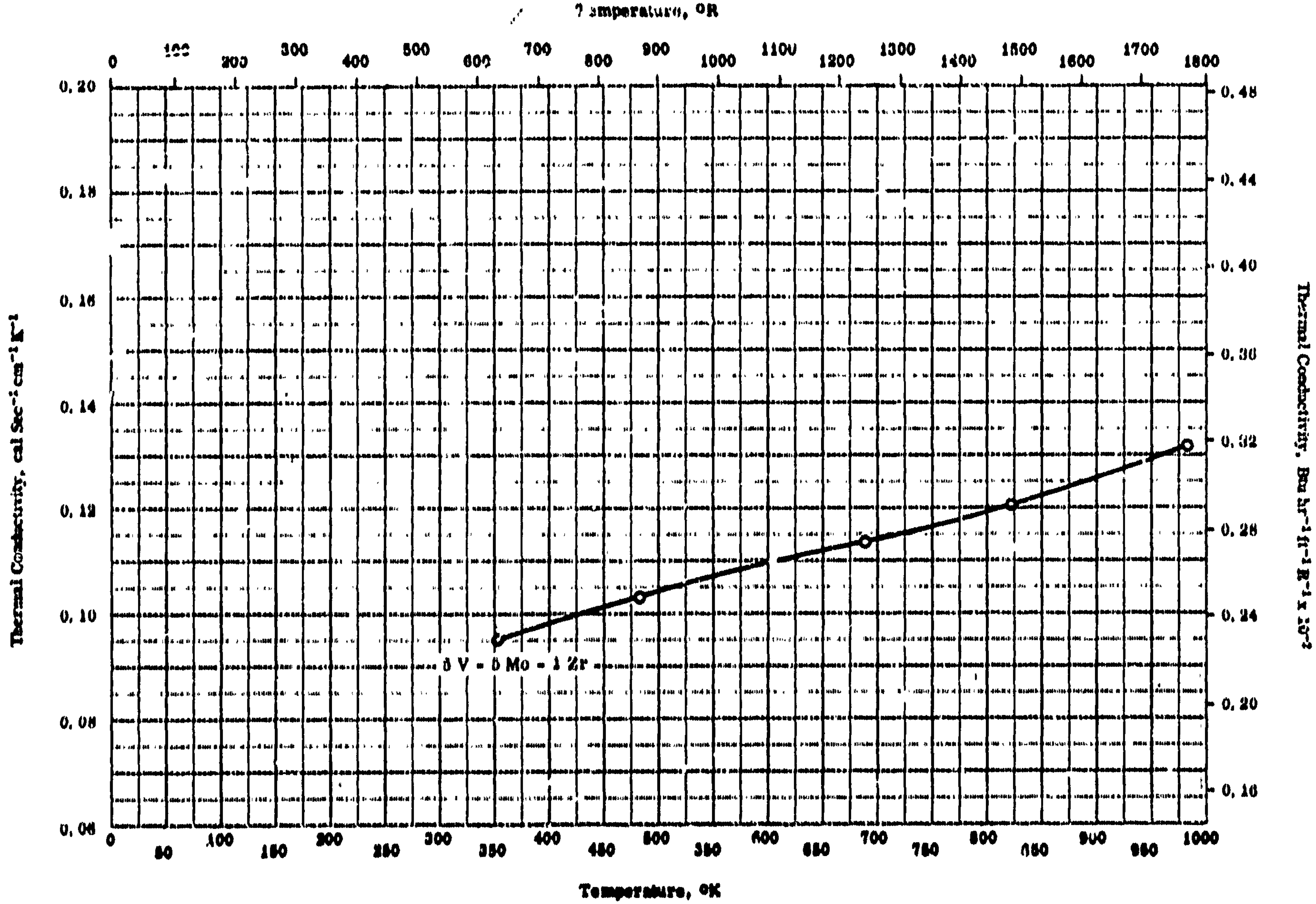


THERMAL LINEAR EXPANSION -- NIOBIUM + TUNGSTEN + ΣX_i

THERMAL LINEAR EXPANSION -- NIOBIUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◇	61-20	298-1422		F-48 (heat No. W-5-T), 0.5 in. gage material; 13.5 - 16.5 W, 4.5 - 5.5 Mo, 0.85 - 1.15 Zr, 0.1 max Ta, 0.02 - 0.04 C, 0.02 - 0.05 O, 0.4 max N and 0.0015 max H.	Measured in argon; heating.
◆	61-20	298-1422		Same as above.	Cooling data of above specimen.
○	63-1	300-2543	2	78.29 Nb, 15.3 W, 5.26 Mo, 1.08 Zr, 0.0340 C, 0.0167 O, 0.0061 H and 0.0211 N; specimen dimension 1/2 in. dia by 6 in. long.	Measured in argon with heating rate of approx 5 F min $^{-1}$.
⌐	63-1	300-2500	2	Haynes Stellite Co.; 87.47 Nb, 9.93 W, 2.58 Zr, 0.002 C, 0.0120 O, 0.0009 H and 0.0060 N; same dimension as above specimen.	Same as above.
△	63-1	300-2558	3	DuPont; 89.26 Nb, 9.7 W, 0.88 Zr, 0.0810 C, 0 0052 O, 0.004 H and 0.0033 N; same dimension as above specimen.	Same as above.
▽	63-23	293-1477		Haynes Alloy Cb-752; 87.48 Nb, 10.0 W, 25 Zr, 0.0040 C, 0.0060 O, < 0.0100 N and 0.0006 H; density 9.02 g cm $^{-3}$.	

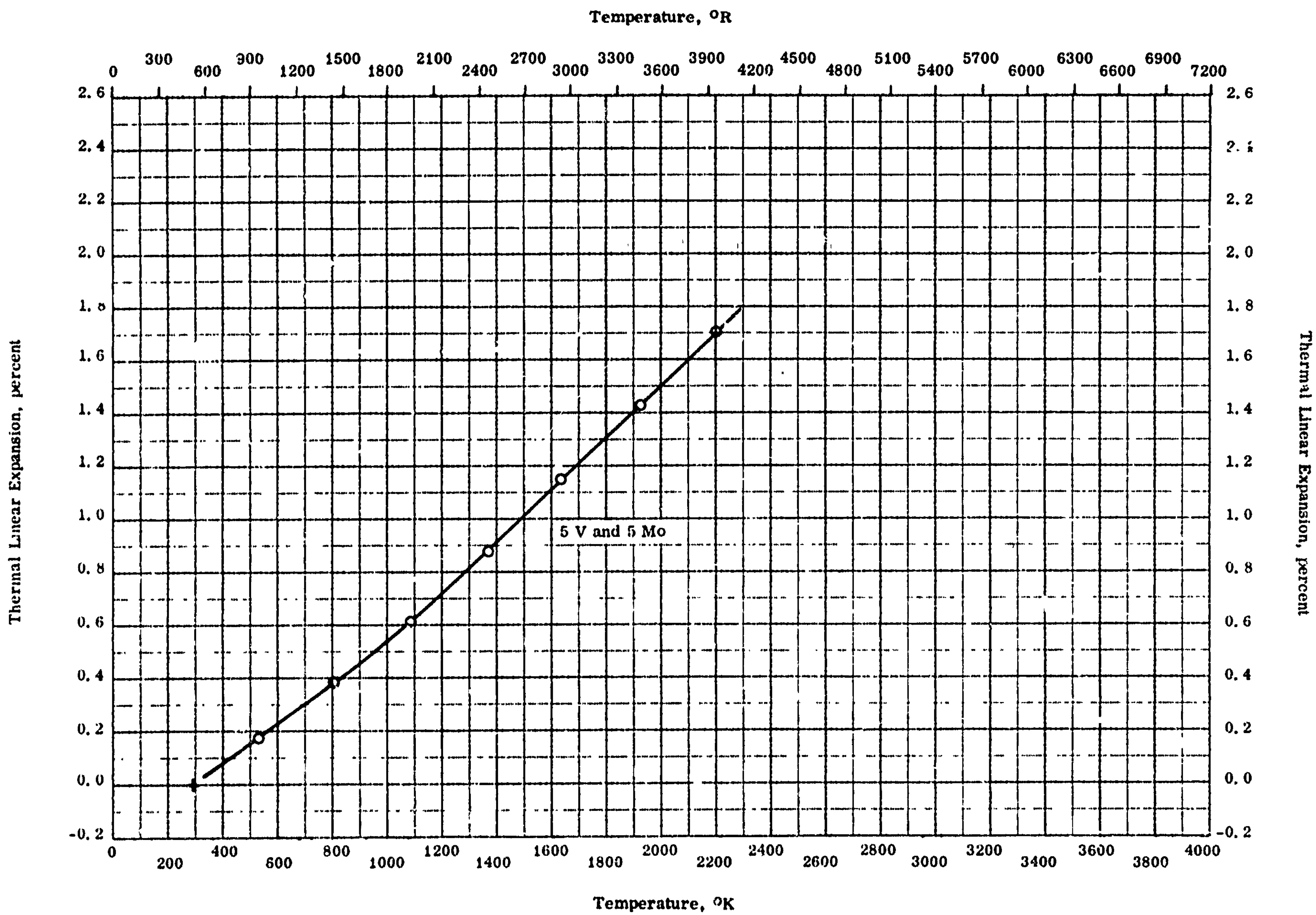


THERMAL CONDUCTIVITY -- NIOBIUM + VANADIUM + ΣX_i

THERMAL CONDUCTIVITY -- NIOBIUM + VANADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	62-8	353-983		5 V, 5 Mo, and 1 Zr; nominal composition.	

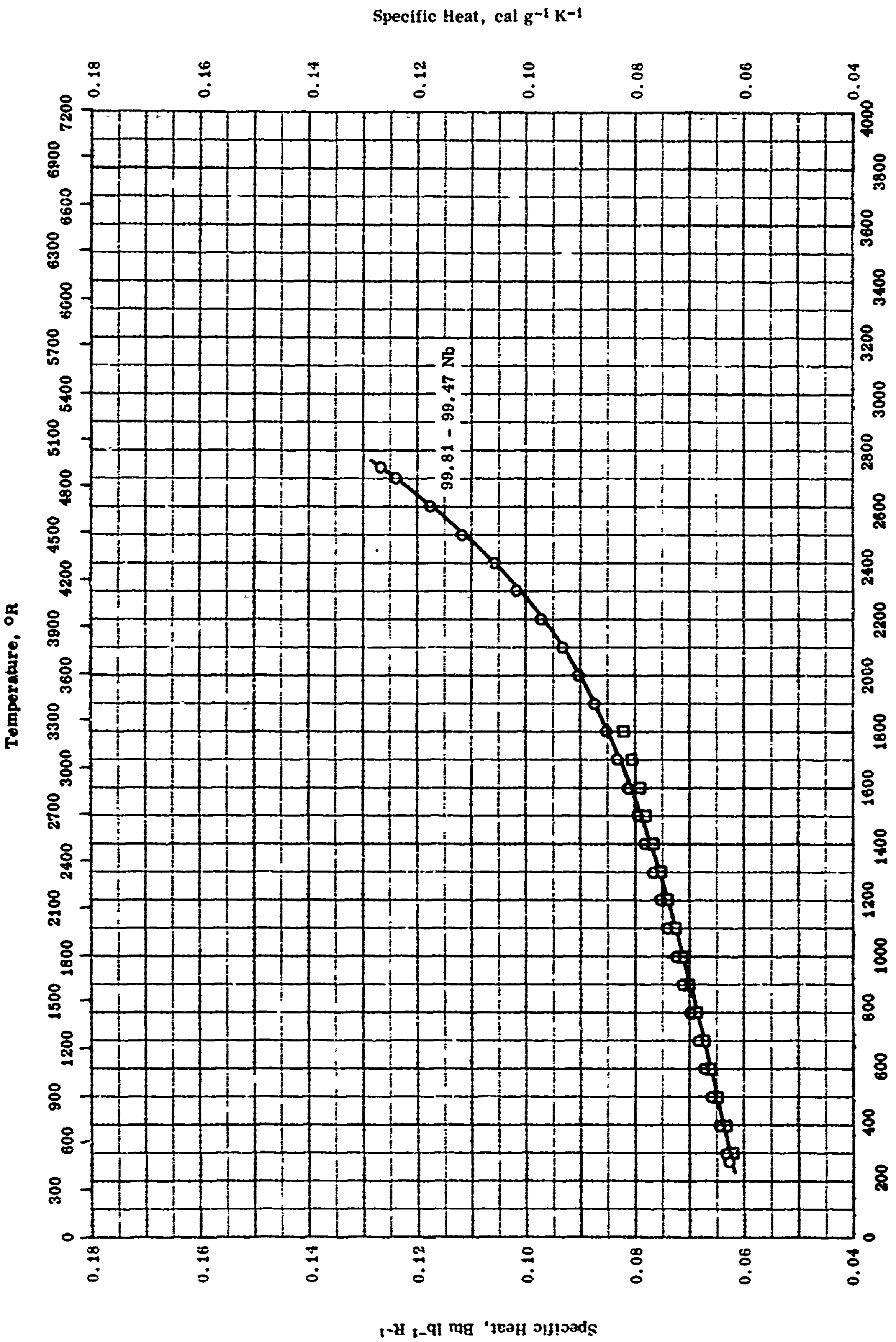


THERMAL LINEAR EXPANSION -- NIOBIUM + VANADIUM + ΣX_i

THERMAL LINEAR EXPANSION -- NIOBIUM + VANADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	62-26	298-2198		B-66 niobium-base alloy; nominal: 5.0 V, 5.0 Mo, 1.0 Zr, 0.012 O, and 0.006 C, N each; density 0.305 lb in.$^{-3}$ and melting point 4300 F.	



SPECIFIC HEAT -- NIOBIUM + ΣX_i

SPECIFIC HEAT -- NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	65-1	273-2740	< 1.0	98.81-99.47 Nb.	Powder metallurgy and electric arc vacuum melting
□	60-10	300-1800		1.0 O_2 impurity.	

PROPERTIES OF PALLADIUM + COBALT + ΣX_i

REPORTED VALUES

Melting Point:		K	R
○	5.6 Co and 5.4 Cu	1617	2911
□	18.6 Co and 12.3 Cu	1452	2614
△	30 Co and 10 Cu	1443	2598
▽	20 Co and 20 Cu	1413	2544
◁	41.2 Co and 11.1 Cu	1434	2581
▷	32.2 Co and 20.8 Cu	1400	2520
◇	19.6 Co and 10.3 Au	1570	2826
●	29.6 Co and 10.2 Au	1463	2634
■	20 Co and 20 Au	1501	2702
▲	29.5 Co and 25.2 Au	1465	2637
▼	34.7 Co and 10.2 Au	1483	2670
◀	20 Co and 15 Au	1493	2688
▶	39.5 Co and 10.2 Au	1483	2670
◆	29.7 Co and 20.2 Au	1463	2634
◐	45 Co and 5.0 Au	1486	2675
◧	39.5 Co and 15.2 Au	1473	2652
◭	29.8 Co and 25.1 Au	1459	2626
▼	40 Co and 20 Au	1463	2634
◆	30 Co and 30 Au	1463	2634

PROPERTIES OF PALLADIUM + COBALT + ΣX_i

REFERENCE INFORMATION

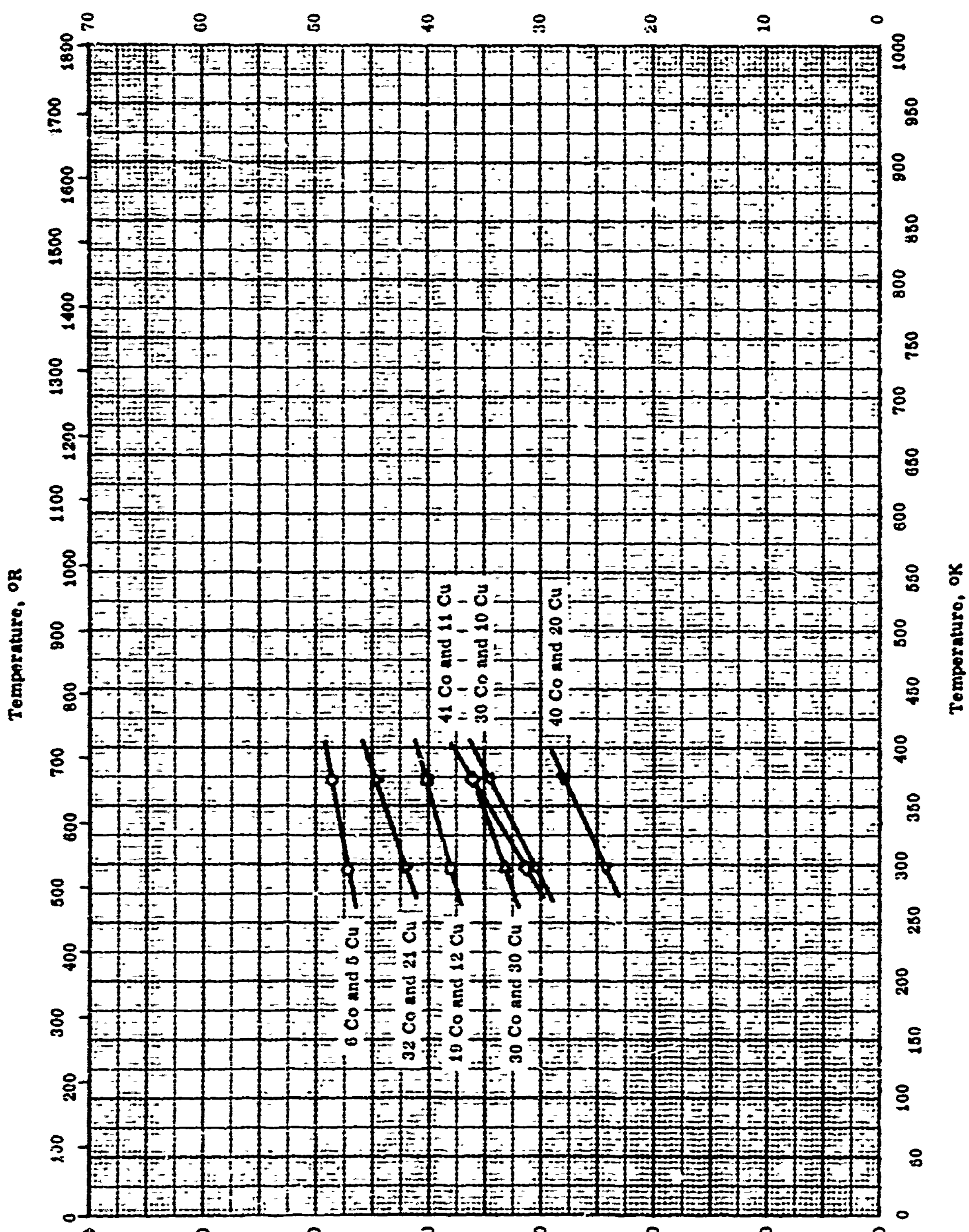
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1617		89.0 Pd, 5.6 Co, and 5.4 Cu.	M. P. from break in time-temperature curve during cooling.
□	56-24	1452		69.1 Pd, 18.6 Co, and 12.3 Cu.	Same as above.
△	56-24	1443		60 Pd, 30 Co, and 10 Cu.	Same as above.
▽	56-24	1413		60 Pd, 20 Co, and 20 Cu.	Same as above.
◁	56-24	1434		47.7 Pd, 41.2 Co, and 11.1 Cu.	Same as above.
▷	56-24	1400		47.0 Pd 32.2 Co, and 20.8 Cu.	Same as above.
◇	56-25	1570		70.1 Pd, 19.6 Co, and 10.3 Au; ingredient with < 0.01 impurities.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled; M.P. obtained same method as above.
●	56-25	1463		60.2 Pd, 29.6 Co, and 10.2 Au; same as above.	Same as above.
■	56-25	1501		60 Pd, 20 Co, and 20 Au; same as above.	Same as above.
▲	56-25	1465		55.3 Pd, 29.5 Co, and 25.2 Au; same as above.	Same as above.
▼	56-25	1483		55.1 Pd, 34.7 Co, and 10.2 Au; same as above.	Same as above.
◀	56-25	1493		55.0 Pd, 20 Co, and 15 Au; same as above.	Same as above.
▶	56-25	1483		50.3 Pd, 39.5 Co, and 10.2 Au; same as above.	Same as above.
◆	56-25	1463		50.1 Pd, 29.7 Co, and 20.2 Au; same as above.	Same as above.
◐	56-25	1486		50 Pd, 45 Co, and 5 Au; same as above.	Same as above.
				(continued onto next page)	

PROPERTIES OF PALLADIUM + COBALT + ΣX_i (Continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
■	56-25	1473		45.3 Pd, 39.5 Co, and 15.2 Au; same as above.	Same as above.
▲	56-25	1459		45.1 Pd, 29.8 Co, and 25.1 Au; same as above.	Same as above.
▼	56-25	1463		40 Pd, 40 Co, and 20 Au; same as above.	Same as above.
◆	56-25	1463		40 Pd, 30 Co, and 30 Au; same as above.	Same as above.

Electrical Resistivity, ohm cm x 10^6



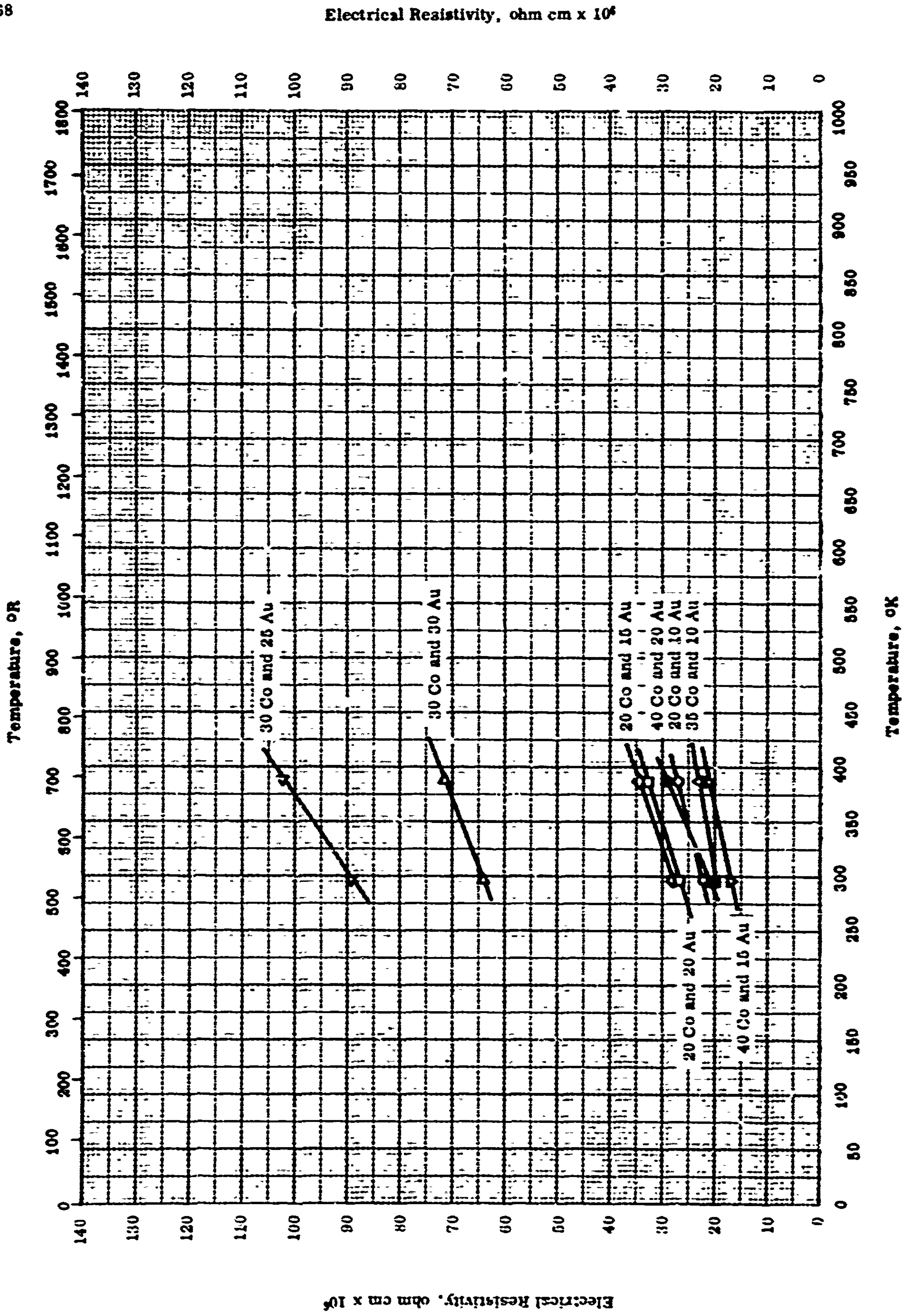
ELECTRICAL RESISTIVITY -- PALLADIUM + COBALT + ΣX_i
(5 - 30 Co and 5 - 30 Cu)

Electrical Resistivity, ohm cm x 10^6

ELECTRICAL RESISTIVITY -- PALLADIUM + COBALT + ΣX_i
(5 - 30 Co and 5 - 30 Cu)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		89.0 Pd, 5.6 Co and 5.4 Cu.	Annealed for 150 hrs at 1000 C in vacuum and cooled in 10 hrs.
□	56-24	298-373		69.1 Pd, 18.6 Co and 12.3 Cu.	Same as above.
△	56-24	298-373		60.0 Pd, 30.0 Co and 10.0 Cu.	Same as above.
◇	56-24	298-373		47.7 Pd, 41.2 Co and 11.1 Cu.	Same as above.
▽	56-24	298-373		47.0 Pd, 32.2 Co and 20.8 Cu.	Same as above.
◁	56-24	298-373		40.0 Pd, 40.0 Co and 20.0 Cu.	Same as above.
▷	56-24	298-373		40.0 Pd, 30.0 Co and 30.0 Cu.	Same as above.



ELECTRICAL RESISTIVITY -- PALLADIUM + COBALT + ΣX_i
(10-40 Co and 10-30 Au)

ELECTRICAL RESISTIVITY -- PALLADIUM + COBALT + ΣX_i
(10-40 Co and 10-30 Au)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	298-373		70.1 Pd, 10.6 Co, and 19.3 Au.	Annealed for 100-150 hrs close to solidus temp. in vacuum and cooled slowly to room temp.
□	56-25	298-373		60 Pd, 20 Co, and 20 Au.	Same as above.
△	56-25	298-373		55.1 Pd, 34.7 Co, and 10.2 Au.	Same as above.
◇	56-25	298-373		65 Pd, 20 Co, and 15 Au.	Same as above.
▽	56-25	298-373		45.3 Pd, 39.5 Co, and 15.2 Au.	Same as above.
◁	56-25	298-373		45.1 Pd, 29.8 Co, and 25.1 Au.	Same as above.
●	56-25	298-373		40 Pd, 40 Co, and 20 Au.	Same as above.
▷	56-25	298-373		40 Pd, 30 Co, and 30 Au.	Same as above.

PROPERTIES OF PALLADIUM + COPPER + ΣX_i

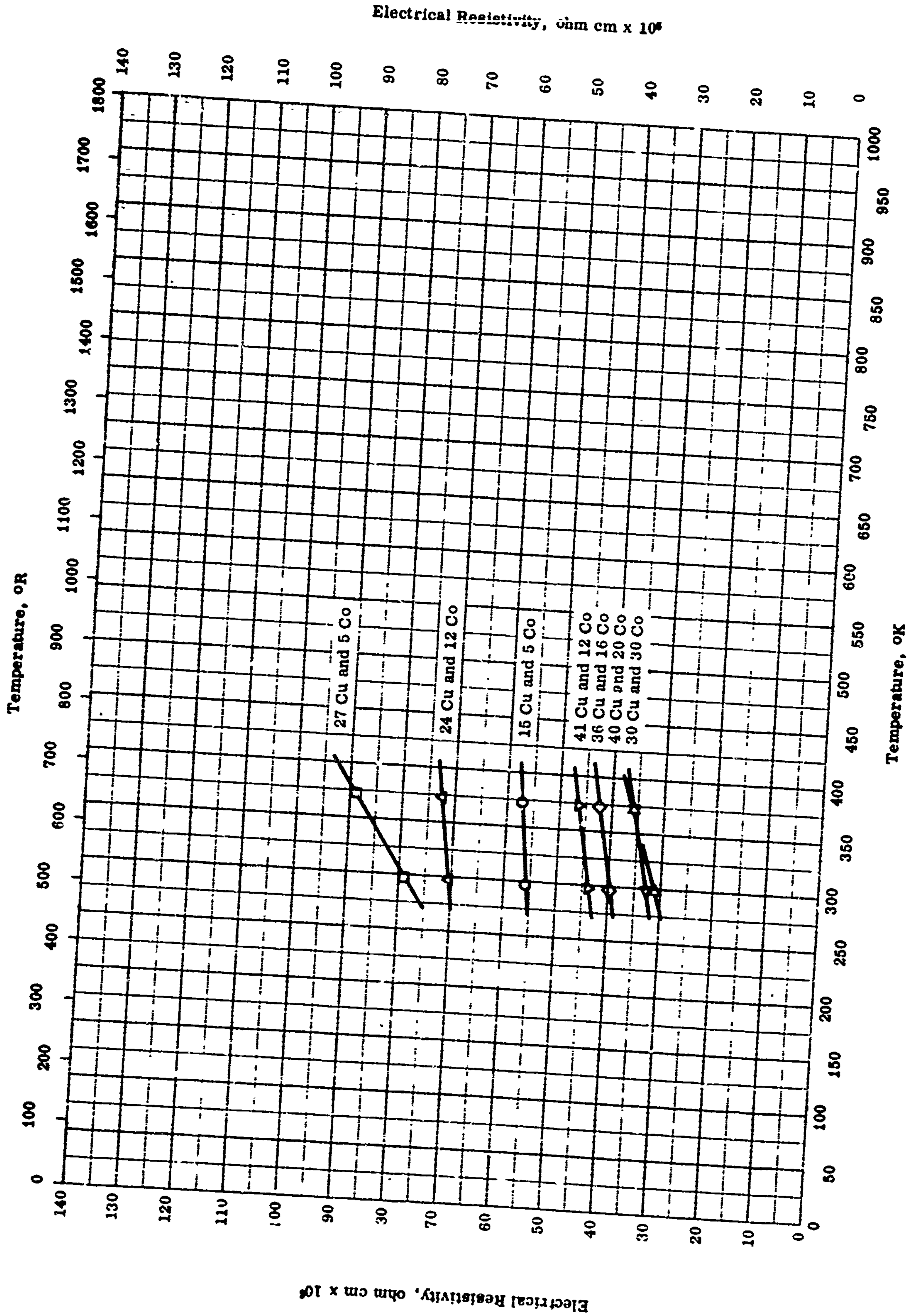
REPORTED VALUES

Melting Point:		K	R
○	26.5 Cu and 5.0 Co	1435	2583
□	21 Cu and 10.5 Co	1427	2569
△	20 Cu and 20 Co	1413	2544
▽	29 Cu and 11.9 Co	1406	2531
◇	35.7 Cu and 16.3 Co	1383	2490
●	41.3 Cu and 12.1 Co	1393	2508

PROPERTIES OF PALLADIUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	1435		68.5 Pd, 26.5 Cu, and 5.0 Co.	M.P. from break in time-temperature curve when cooling.
□	56-24	1427		68.5 Pd, 21 Cu, and 10.5 Co.	Same as above.
△	56-24	1413		60 Pd, 20 Cu, and 20.0 Co.	Same as above.
▽	56-24	1406		59.1 Pd 29.0 Cu, and 11.9 Co.	Same as above.
◇	56-24	1383		48 Pd, 35.7 Cu, and 16.3 Co.	Same as above.
●	56-24	1393		47.6 Pd, 41.3 Cu and 12.1 Co.	Same as above.



ELECTRICAL RESISTIVITY -- PALLADIUM + COPPER + ΣX_i
(15 - 40 Cu and 5 - 30 Co)

ELECTRICAL RESISTIVITY -- PALLADIUM + COPPER + ΣX_i
(15 - 40 Cu and 5 - 30 Co)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-24	298-373		80 Pd, 15 Cu, and 5 Co.	Annealed for 150 hrs at 1000 C in vacuum and cooled in 10 hrs.
□	56-24	298-373		68.5 Pd, 26.5 Cu, and 5.0 Co.	Same as above.
△	56-24	298-373		59.1 Pd, 24.0 Cu, and 11.9 Co.	Same as above.
◇	56-34	298-373		48.0 Pd, 35.7 Cu, and 16.3 Co.	Same as above.
▽	56-24	298-373		47.6 Pd, 41.3 Cu, and 12.1 Co.	Same as above.
▷	56-24	298-373		40 Pd, 40 Cu, and 20 Co.	Same as above.
◁	56-24	298-373		40 Pd, 30 Cu, and 30 Co.	Same as above.

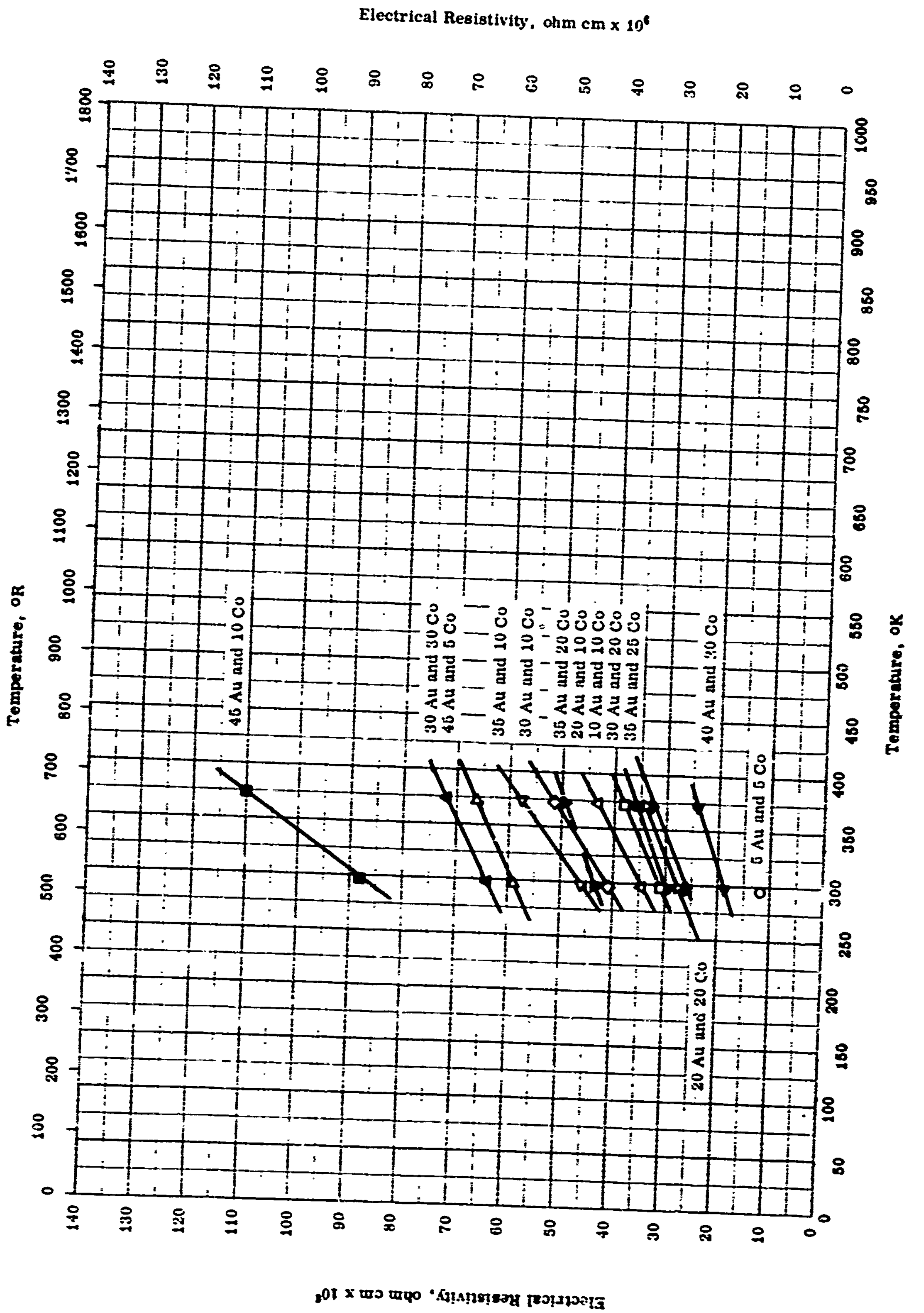
PROPERTIES OF PALLADIUM + GOLD + ΣX_i

REPORTED VALUES

Melting Point	K	R
○ 5.1 Au and 4.7 Co	1651	2972
□ 10.2 Au and 9.8 Co	1605	2889
△ 20 Au and 10 Co	1591	2864
▽ 30 Au and 10 Co	1567	2821
◁ 20 Au and 20 Co	1501	2702
▷ 35 Au and 10 Co	1553	2796
◇ 45 Au and 5 Co	1603	2886
● 40 Au and 10 Co	1553	2796
■ 30 Au and 20 Co	1466	2639
▲ 45 Au and 10 Co	1533	2760
▼ 35 Au and 20 Co	1463	2634
◀ 40 Au and 20 Co	1466	2639
▶ 35 Au and 25 Co	1459	2626
◆ 30 Au and 30 Co	1463	2634

REFERENCE INFORMATION

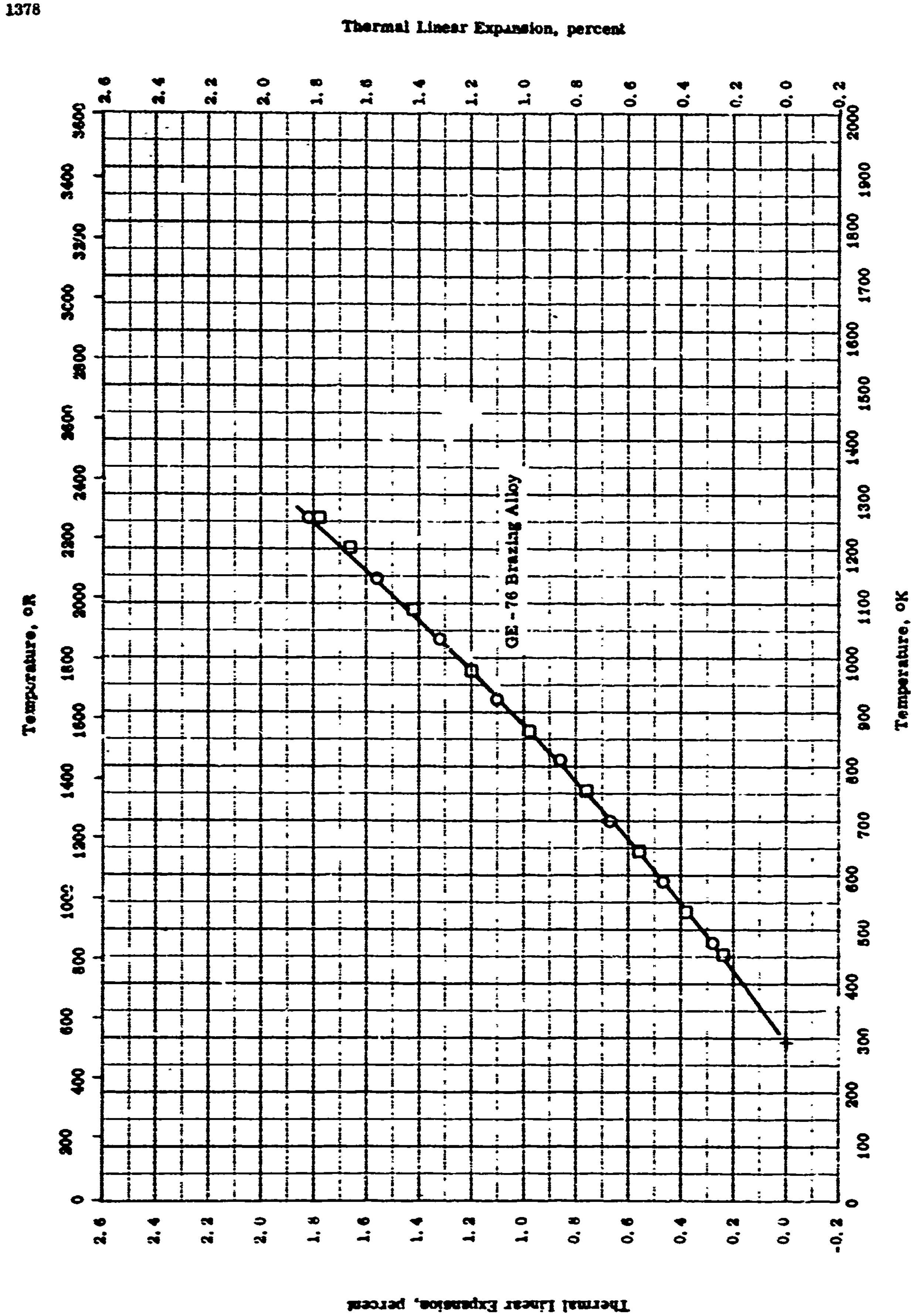
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	1651		90.2 Pd, 5.1 Au, and 4.7 Co; ingredients with <0.01 impurities.	Annealed in vacuum 100-150 hrs close to solidus temperature and slowly cooled; M.P. from break in time-temperature curve during cooling.
□	56-25	1605		80. Pd, 10.2 Au, and 9.8 Co; same as above.	Same as above.
△	56-25	1591		70 Pd, 20 Au, and 10 Co; same as above.	Same as above.
▽	56-25	1567		60 Pd, 30 Au, and 10 Co; same as above.	Same as above.
◁	56-25	1501		60 Pd, 20 Au, and 20 Co; same as above.	Same as above.
▷	56-25	1553		55 Pd, 35 Au, and 10 Co; same as above.	Same as above.
◇	56-25	1603		50 Pd, 45 Au, and 5 Co; same as above.	Same as above.
●	56-25	1563		50 Pd, 40 Au, and 10 Co; same as above.	Same as above.
■	56-25	1466		50 Pd, 30 Au, and 20 Co; same as above.	Same as above.
▲	56-25	1533		45 Pd, 45 Au, and 10 Co; same as above.	Same as above.
▼	56-25	1463		[illegible]5 Pd, 35 Au, and 20 Co; same as above.	Same as above.
◀	56-25	1466		40 Pd, 40 Au, and 20 Co; same as above.	Same as above.
▶	56-25	1459		40 Pd, 35 Au, and 25 Co; same as above.	Same as above.
◆	56-25	1463		40 Pd, 30 Au, and 30 Co; same as above.	Same as above.



ELECTRICAL RESISTIVITY — PALLADIUM + GOLD + ΣX_i

REFERENCE INFORMATION

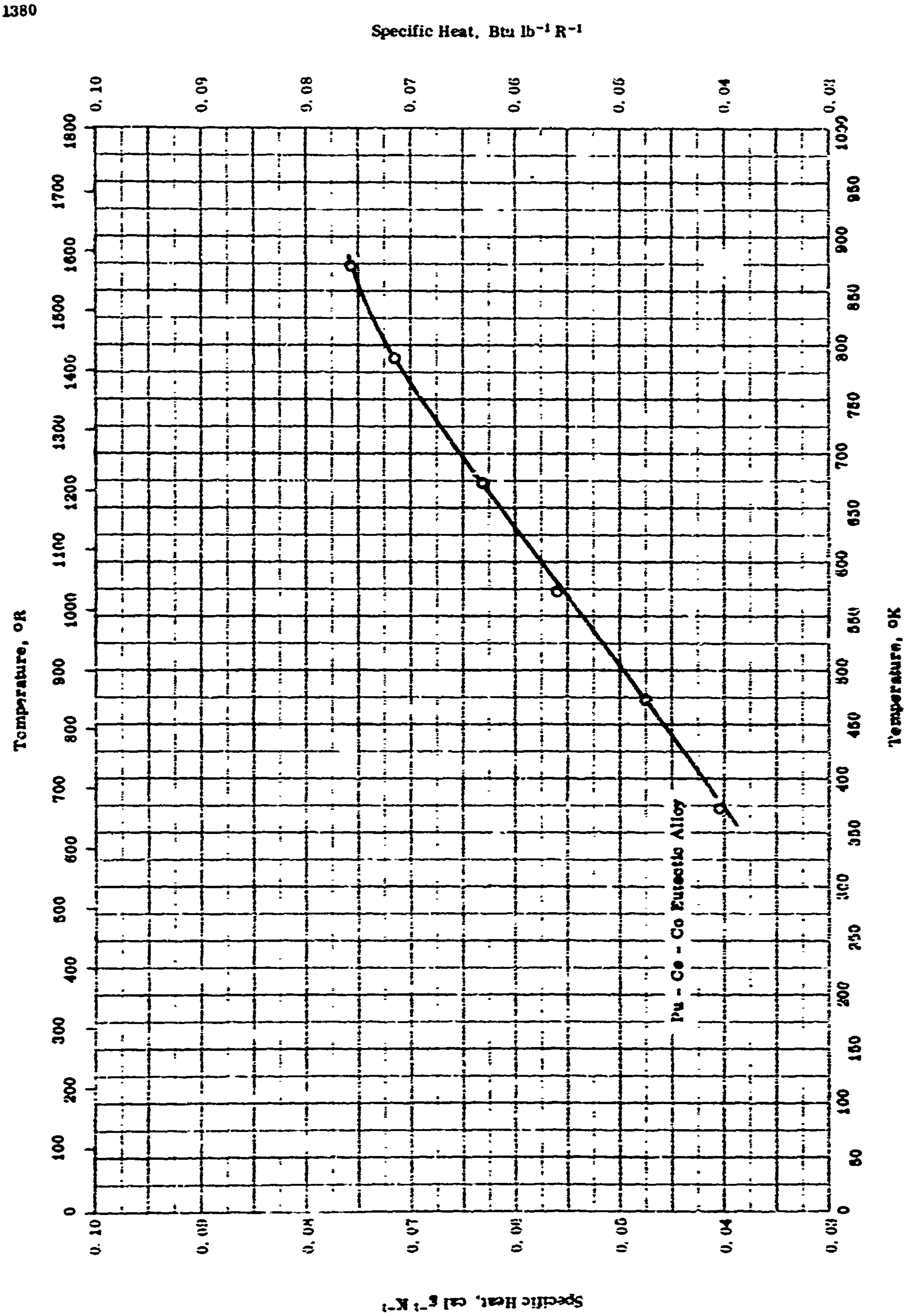
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-25	298-373		90.2 Pd, 5.1 Au, and 4.7 Co.	Annealed for 100-150 hrs, close to solidus temperature in vacuum, and cooled slowly to room temperature.
□	56-25	298-373		80.0 Pd, 10.2 Au, and 9.8 Co.	Same as above.
△	56-25	298-373		70 Pd, 20 Au, and 10 Co.	Same as above.
◇	56-25	298-373		60 Pd, 30 Au, and 10 Co.	Same as above.
▽	56-25	298-373		60 Pd, 20 Au, and 20 Co.	Same as above.
◁	56-25	298-373		55 Pd, 35 Au, and 10 Co.	Same as above.
▷	56-25	298-373		50 Pd, 45 Au, and 5 Co.	Same as above.
●	56-25	298-373		50 Pd, 30 Au, and 20 Co.	Same as above.
■	56-25	298-373		45 Pd, 45 Au, and 10 Co.	Same as above.
▼	56-25	298-373		45 Pd, 35 Au, and 20 Co.	Same as above.
◀	56-25	298-373		40 Pd, 40 Au, and 20 Co.	Same as above.
◆	56-25	298-373		40 Pd, 35 Au, and 25 Co.	Same as above.
▲	56-25	200-373		40 Pd, 30 Au, and 30 Co.	Same as above.



THERMAL LINEAR EXPANSION -- PALLADIUM + NICKEL + ΣXi

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-30	293-1255	±2	GE-70 Brazing Alloy; nominal: 44 Pd, 33 Ni, and 23 Cr; analysis shows 0.05 Si and 0.014 S.	As cast; average data of two complete heating and cooling cycles; tested in 40μ Hg vacuum with a heating rate at 5.4 F min^{-1}.
□	54-30	293-1255	±2	Same as above.	Same as above except cast and heat treated 24 hrs at 2000 F in argon atmosphere.



SPECIFIC HEAT -- PLUTONIUM + CERIUM + ΣXi

SPECIFIC HEAT -- PLUTONIUM + CERIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-11	373-873		Pu - Ce - Co eutectic alloy.	

PROPERTIES OF PRASEODYMIUM + ΣX_i

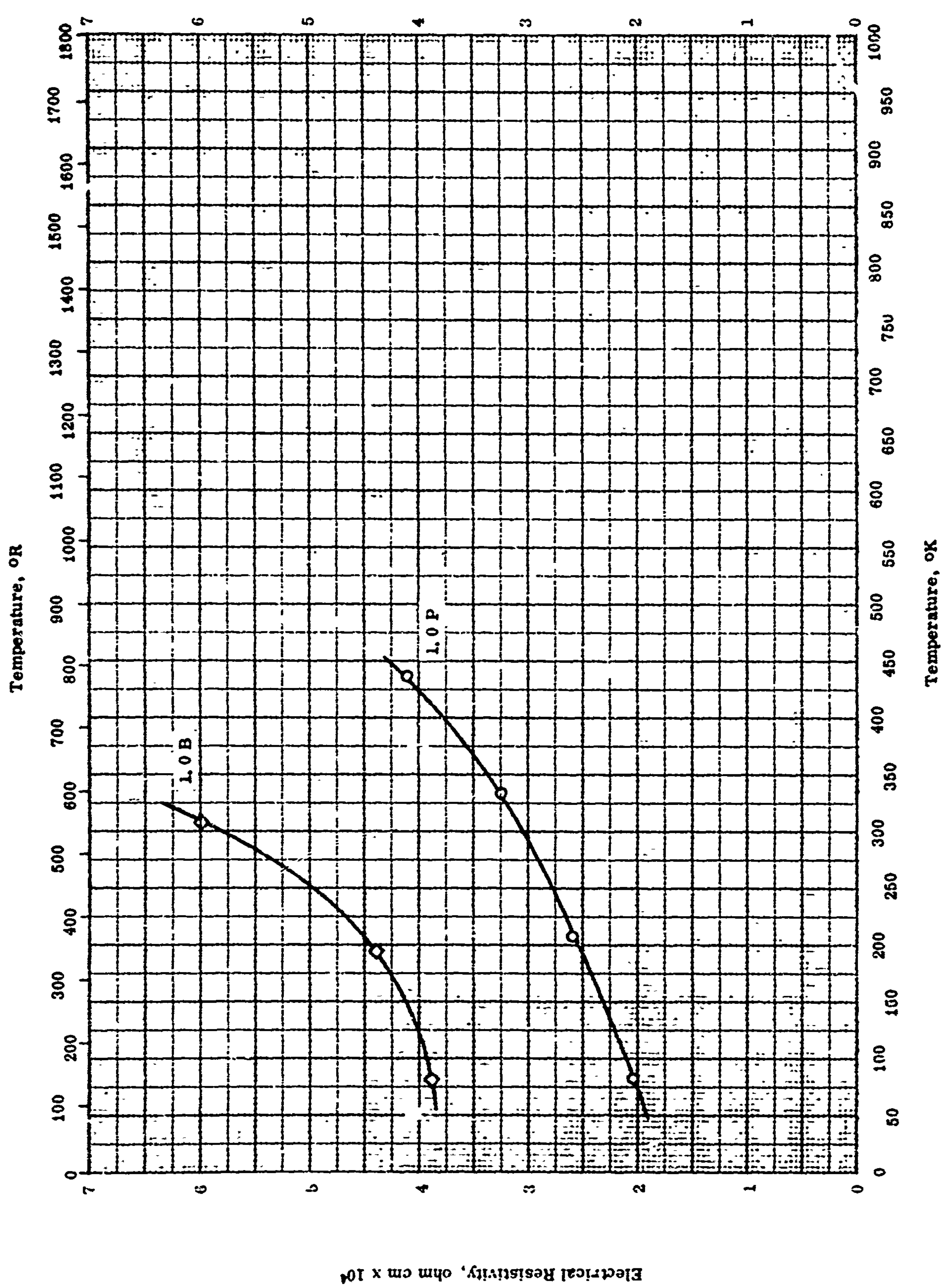
REPORTED VALUES

Melting Point:	K	R
O ≈ 99 pure	1159	2087

REFERENCE INFORMATION

Sym-bol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	43-3	1160		99 estimated purity.	Possibility of sample contamination by crucible and by O_2 considered by authors.

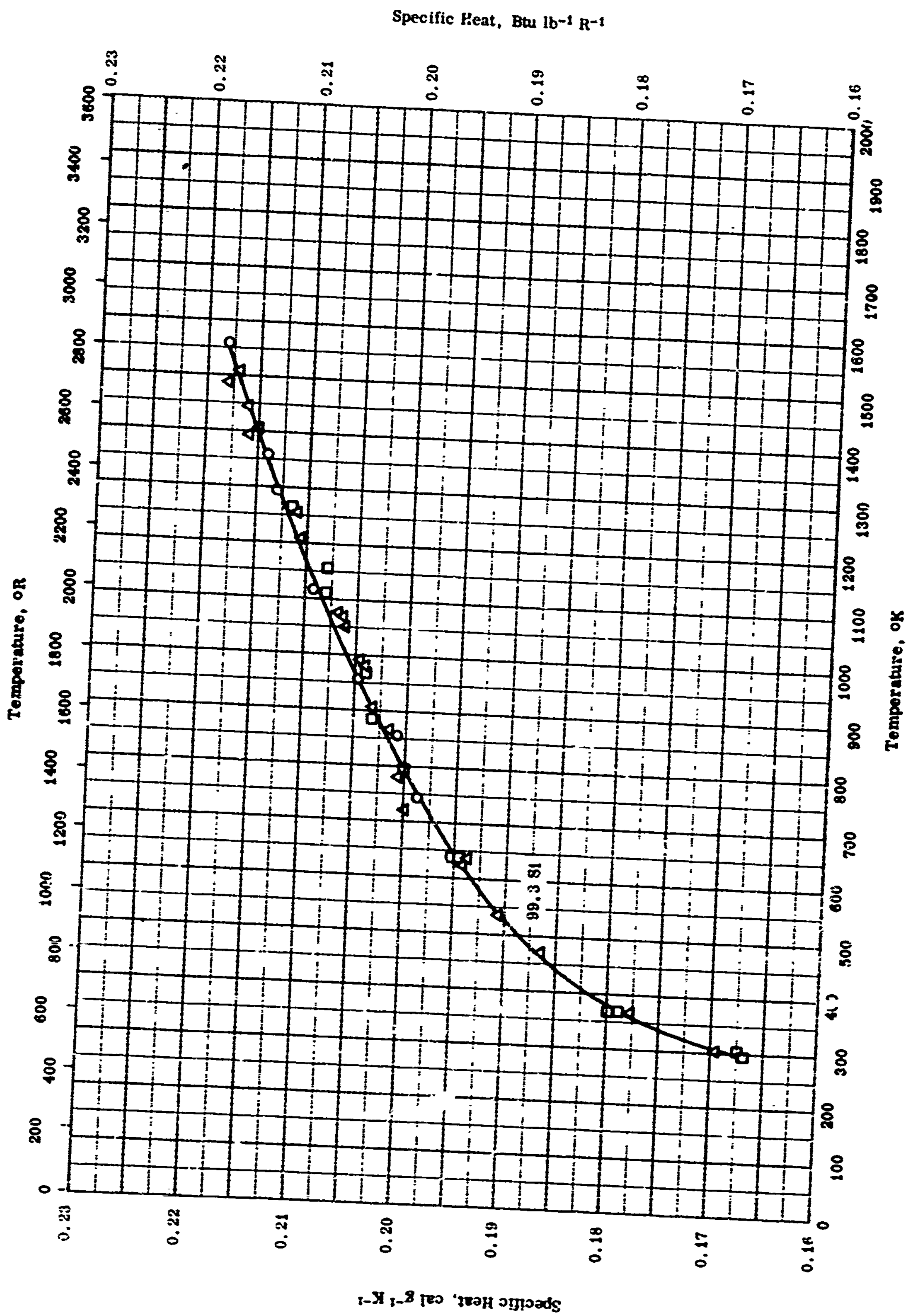
Electrical Resistivity, ohm cm x 10^4



ELECTRICAL RESISTIVITY -- SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	49-5	83-435		1.0 B.	Author estimates $\gamma = 10^6$ ohm cm for ideally pure Si at room temp.
◇	49-5	83-306		1.0 P.	Same as above.



SPECIFIC HEAT -- SILICONE + ΣX_i

SPECIFIC HEAT -- SILICONE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-8	741-1556		Specimen 1; 99.3 Si.	
□	52-8	297-1261		Specimen 2; 99.3 Si.	
△	52-8	297-1509		Specimen 3; 99.3 Si.	

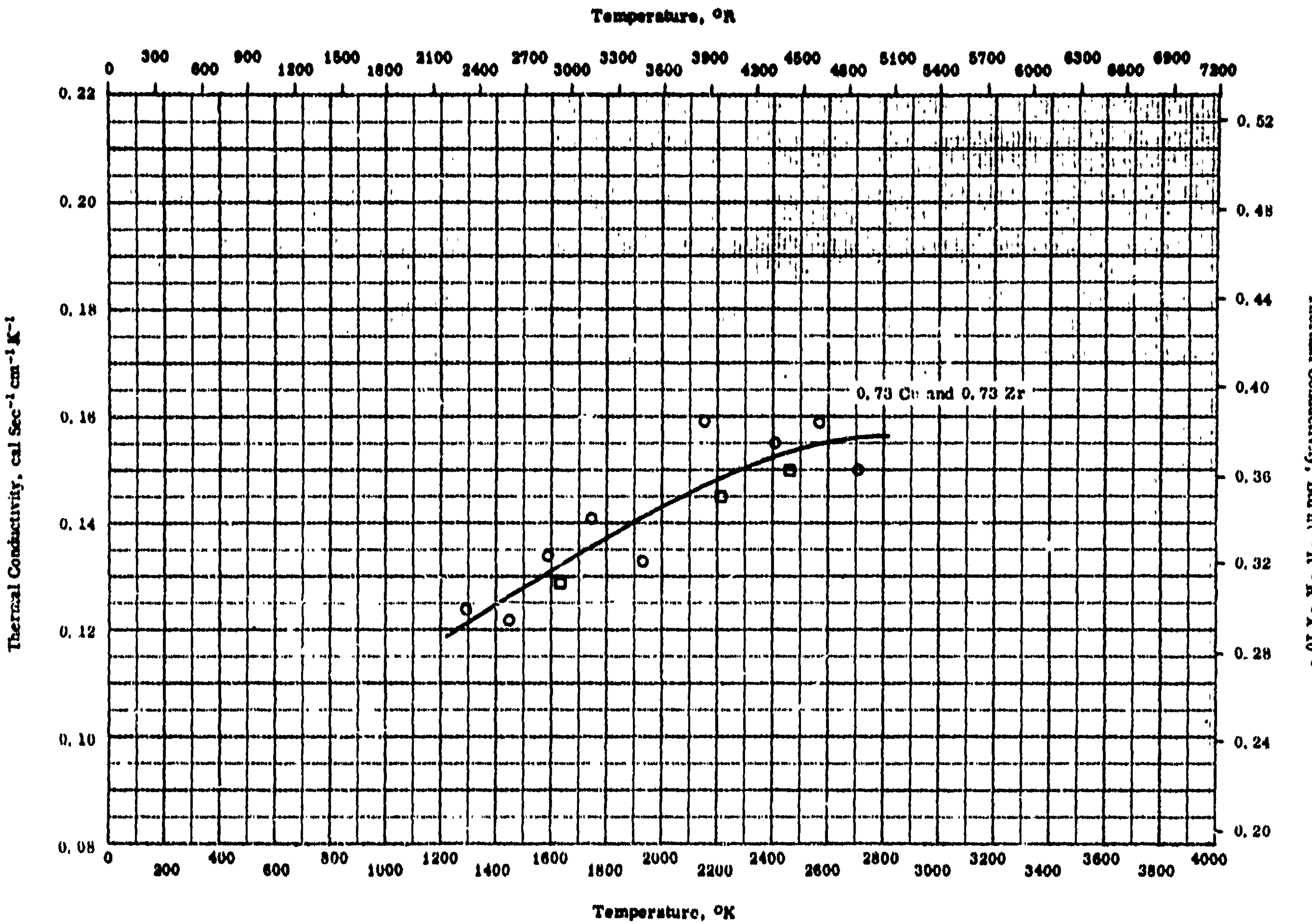
PROPERTIES OF TANTALUM + COPPER + ΣX_i

REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
O 0.[illegible] Cu and 0.73 Zr	16.66	1040

REFERENCE INFORMATION

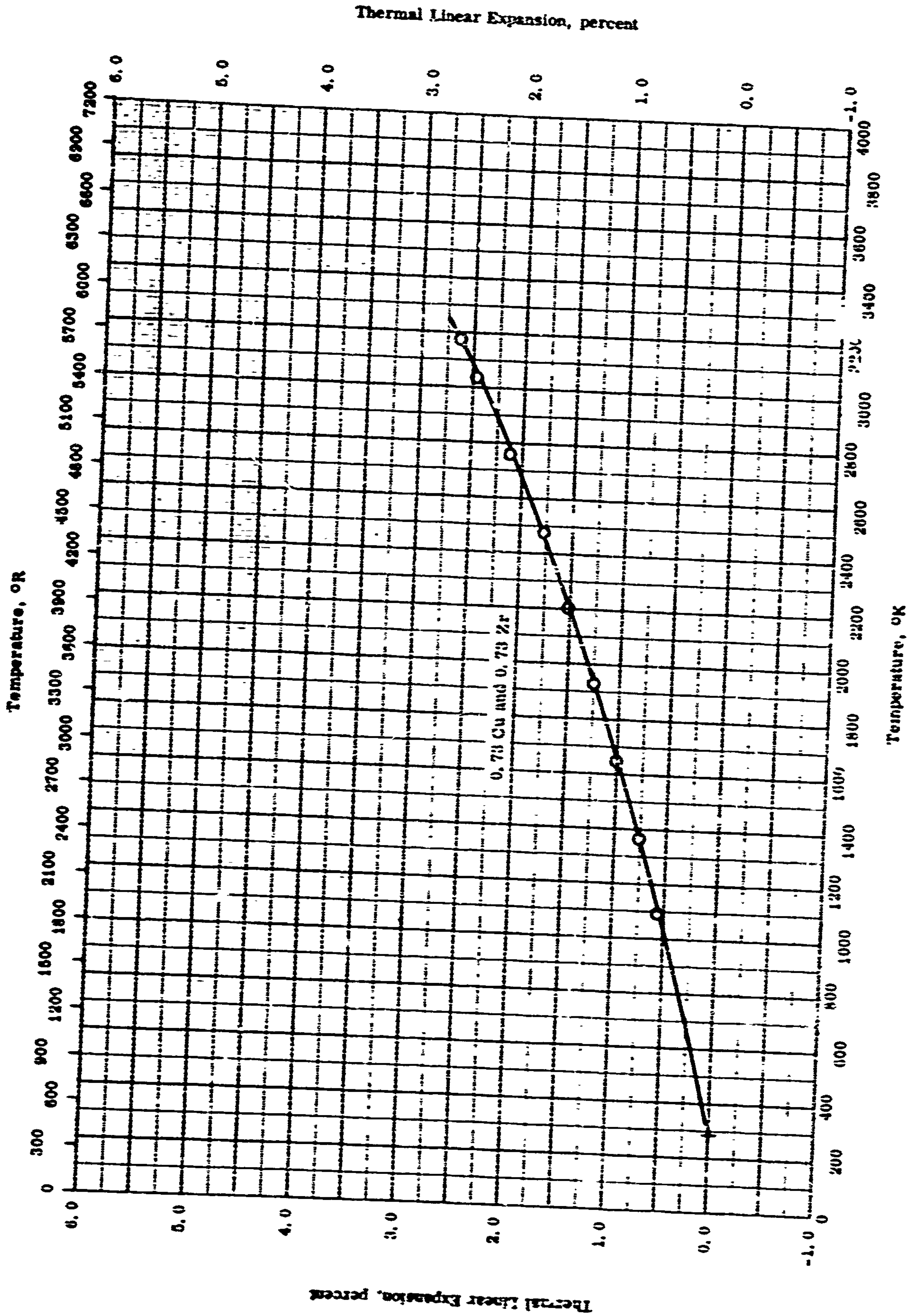
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-7	298		0.73 each Cu and Zr, 0.21 Fe, 0.09 Ni, 0.08 C, 0.07 Co, 0.03 Mn, 0.02 Si, 0.017Al, 0.0047 Cr, and 0.0033 Ca.	Sintered, then swaged; letter from authors corrects error in original reference.



THERMAL CONDUCTIVITY -- TANTALUM + COPPER + ΣX_i

REFERENCE INFORMATION

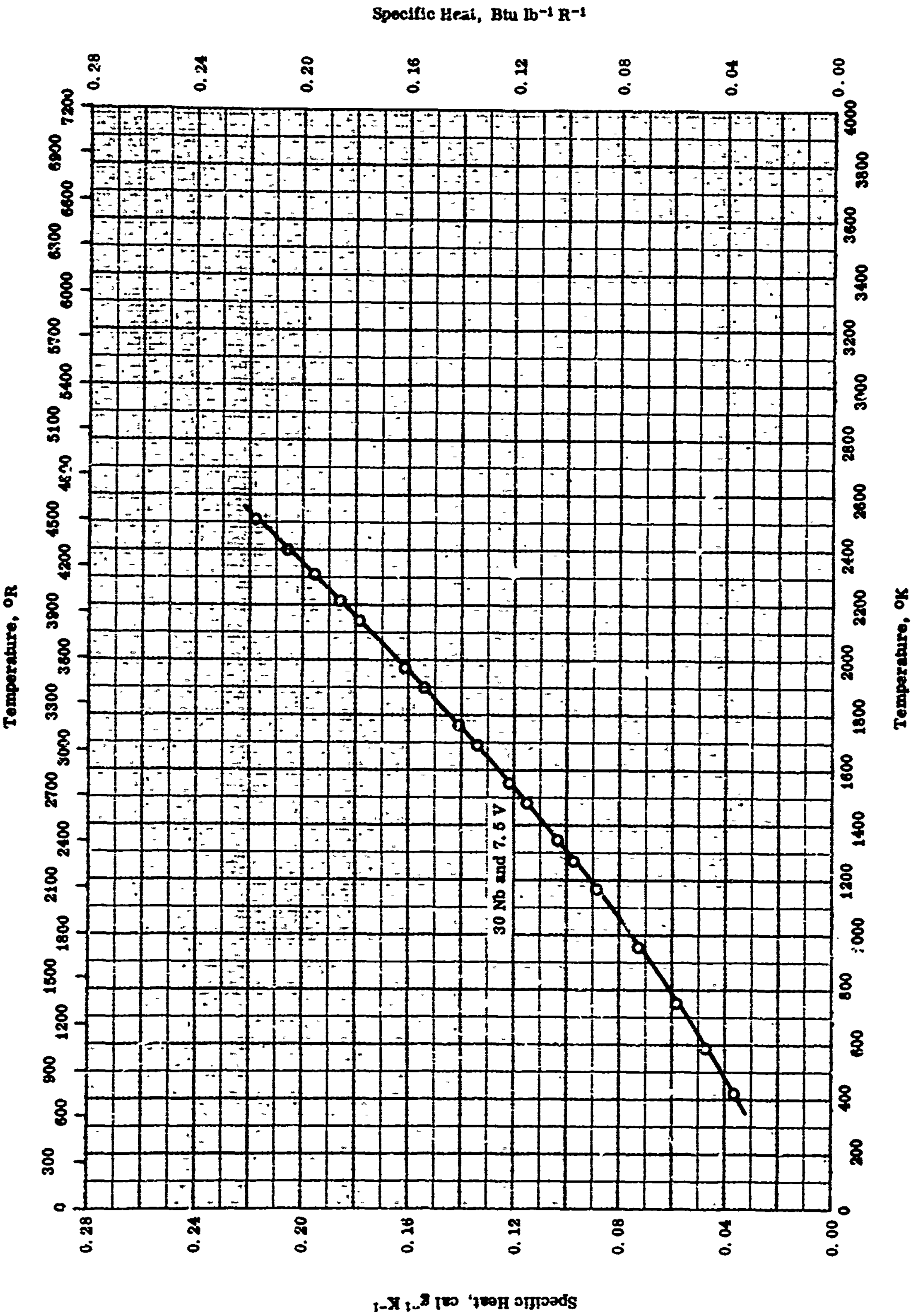
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-7	1294-2733		Composition before test: 0.73 Cu, 0.73 Zr, 0.21 Fe, 0.09 Ni, 0.08 C, 0.07 Co, 0.03 Mn, 0.02 Si, 0.017 Al, 0.0047 Cr, and 0.0033 Ca, and after test: 0.015 C, 0.013 Si, 0.0023 Cr, and 0.0019 Cu; density 1040 lb ft^{-3}.	Sintered; swaged to give density; heating.
□	56-7	1552-2467		Same as above.	Same as above except measured during cooling.



THERMAL LINEAR EXPANSION -- TANTALUM + COPPER + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	56-7	1089-3172		Before test: 0.73 Cu, 0.73 Zr, 0.21 Fe, 0.090 Ni, 0.080 C, 0.070 Co, 0.030 Mn, 0.020 Si, 0.004 Cr, and 0.0033 Ca; after test: 0.0160 C, 0.013 Si, 0.0023 Cr, 0.0019 Cu, and none of others; density 1040 lb ft^{-3}.	Pressed, sintered, and swaged to given density; data shown are smoothed; taking during second heating and cooling cycle; letter from author indicates error in original reference which gives density 14.0 g cm^{-3}, corrected density 16.66 g cm^{-3}.

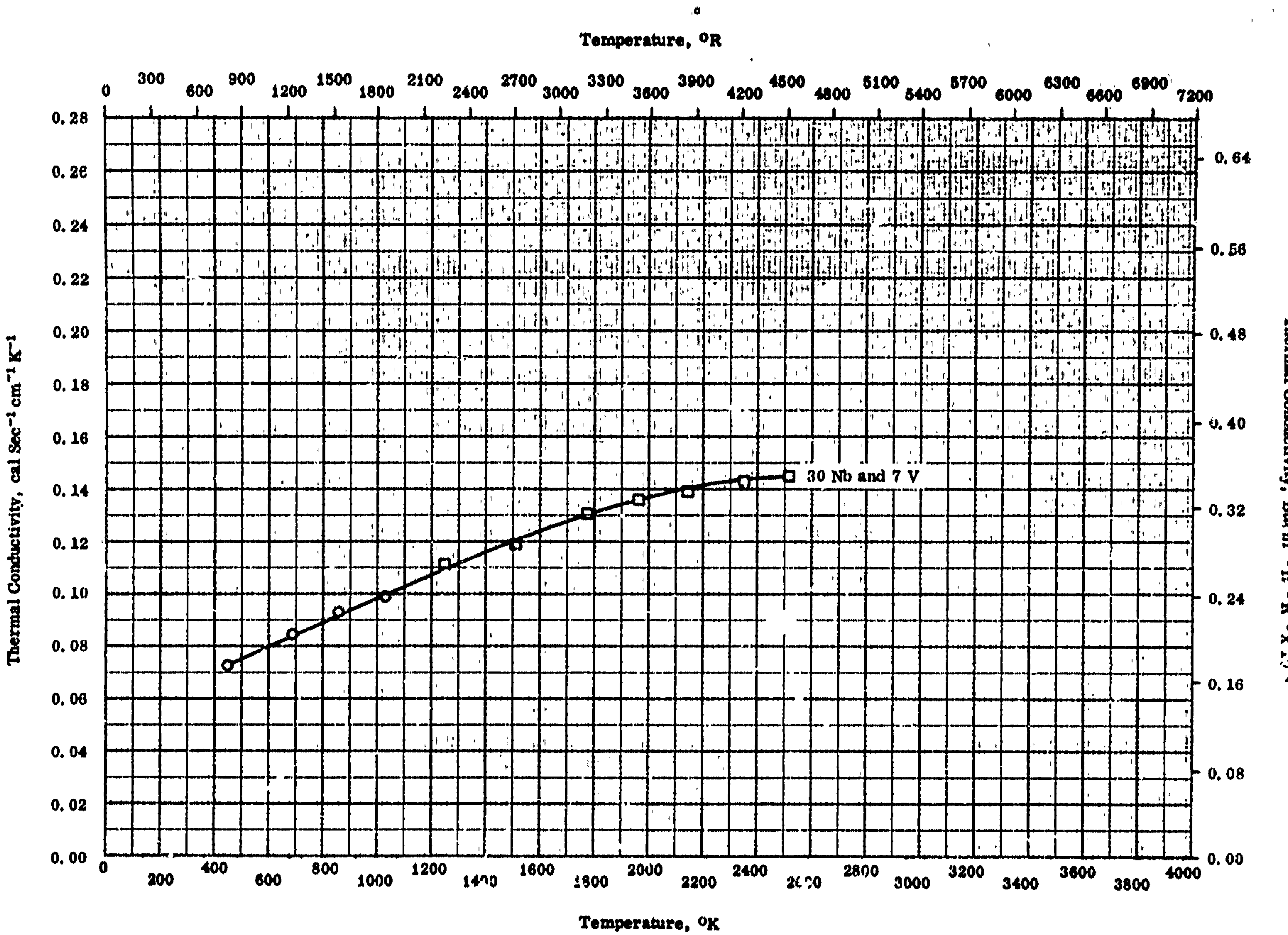


SPECIFIC HEAT -- TANTALUM + NIOBIUM + ΣX_i

SPECIFIC HEAT -- TANTALUM + NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-1	422-2510	±5.0	Ta - 50 Cb - 7.5 V alloy; 30.3 Nb, 7.47 V, 0.090 C, 0.0150 O_2, and 0.0065 N_2.	

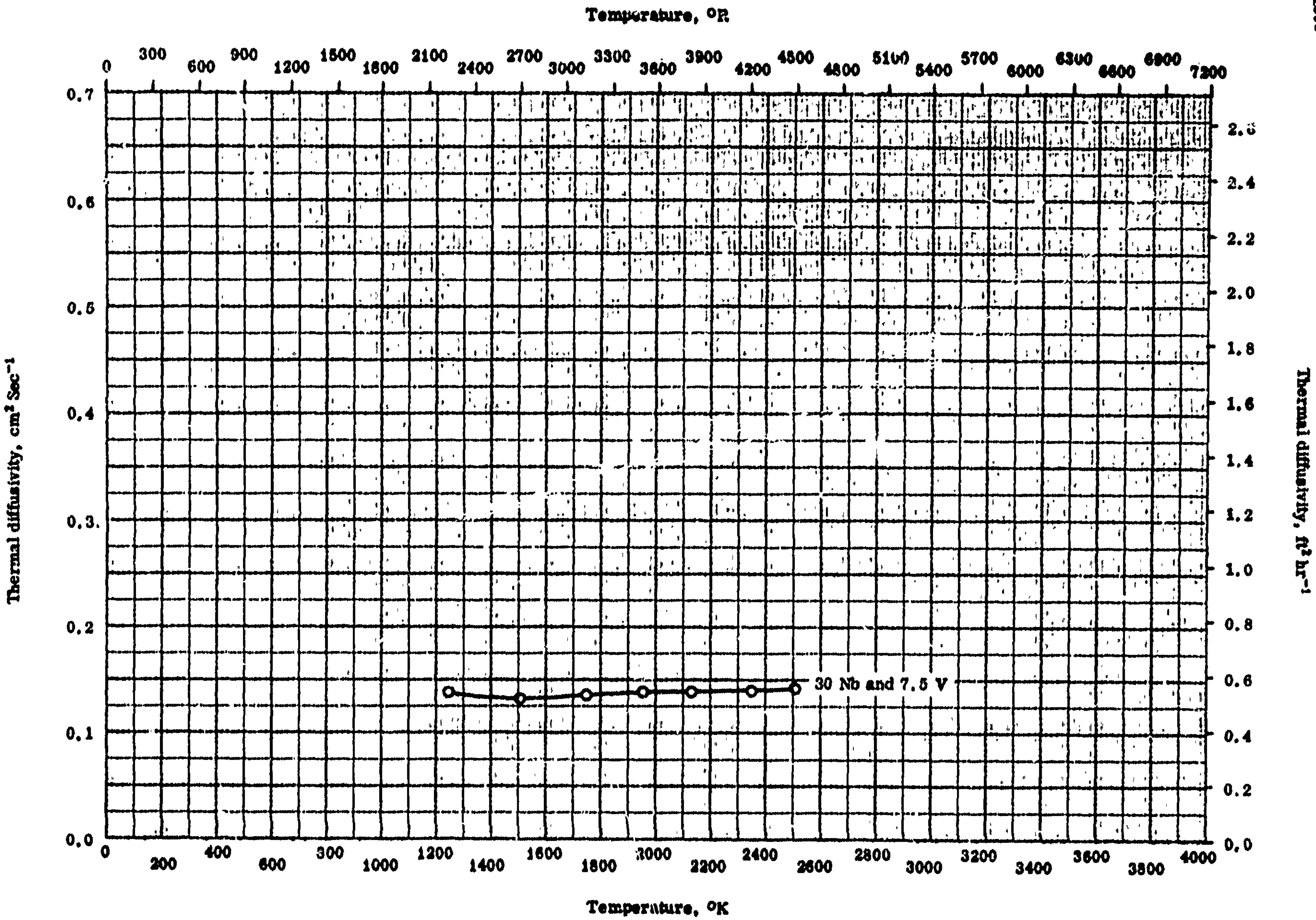


THERMAL CONDUCTIVITY -- TANTALUM + NIOBIUM + ΣX_i

THERMAL CONDUCTIVITY -- TANTALUM + NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	453-1030	±4	62.12 Ta, 30.3 Nb, 7.47 V, 0.090 C, 0.0150 O_2, and 0.0065 N_2; density 721 lb ft^{-3}.	End surface ground flat and parallel; measured in a He atm.
□	63-1	246-2511	±4	Same as above.	The above sample measured by another method.

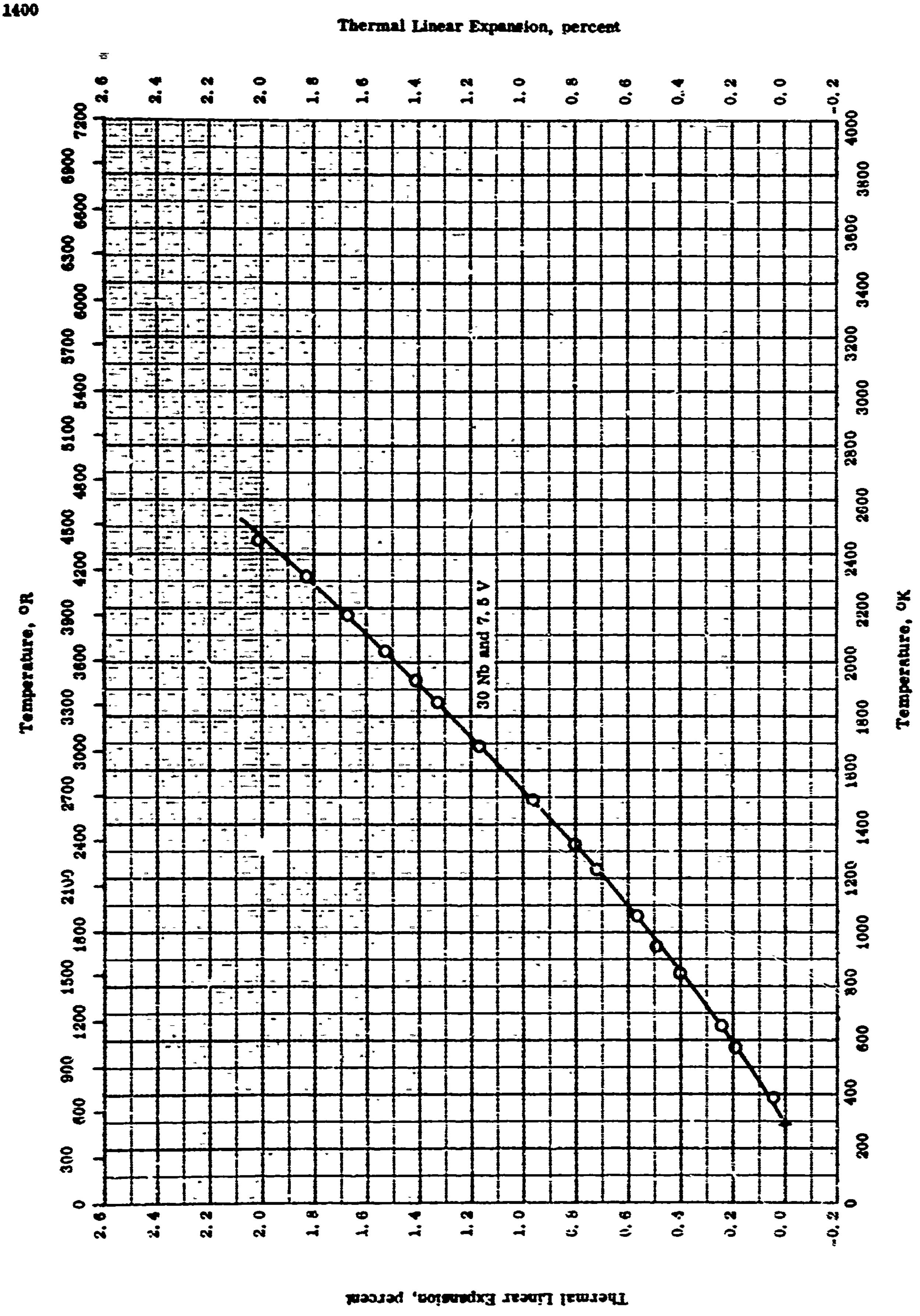


THERMAL DIFFUSIVITY -- TANTALUM + NIOBIUM + ΣX_i

THERMAL DIFFUSIVITY -- TANTALUM + NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	63-1	1246-2513		Ta-30 Nb-7.5 V; 30.3 Nb, 7.47 V, 0.090 C, 0.0150 O_2, and 0.0065 N_2; density 11.55 g cm^{-3}.	Surface ground discs.



THERMAL LINEAR EXPANSION -- TANTALUM + NIOBIUM + ΣX_i

THERMAL LINEAR EXPANSION -- TANTALUM + NIOBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	63-1	300-2443	2	Wah Chang Corp.; 62.12 Ta, 30.3 Nb, 7.47 V, 0.090 C, 0.0150 O, and 0.0065 N; density 721 lb ft^{-3}; dimension 1/2 in. dia. by 6 in. long.	Measured in argon with heating rate of approx. 5 F min^{-1}.

PROPERTIES OF TANTALUM + TUNGSTEN + ΣX_i

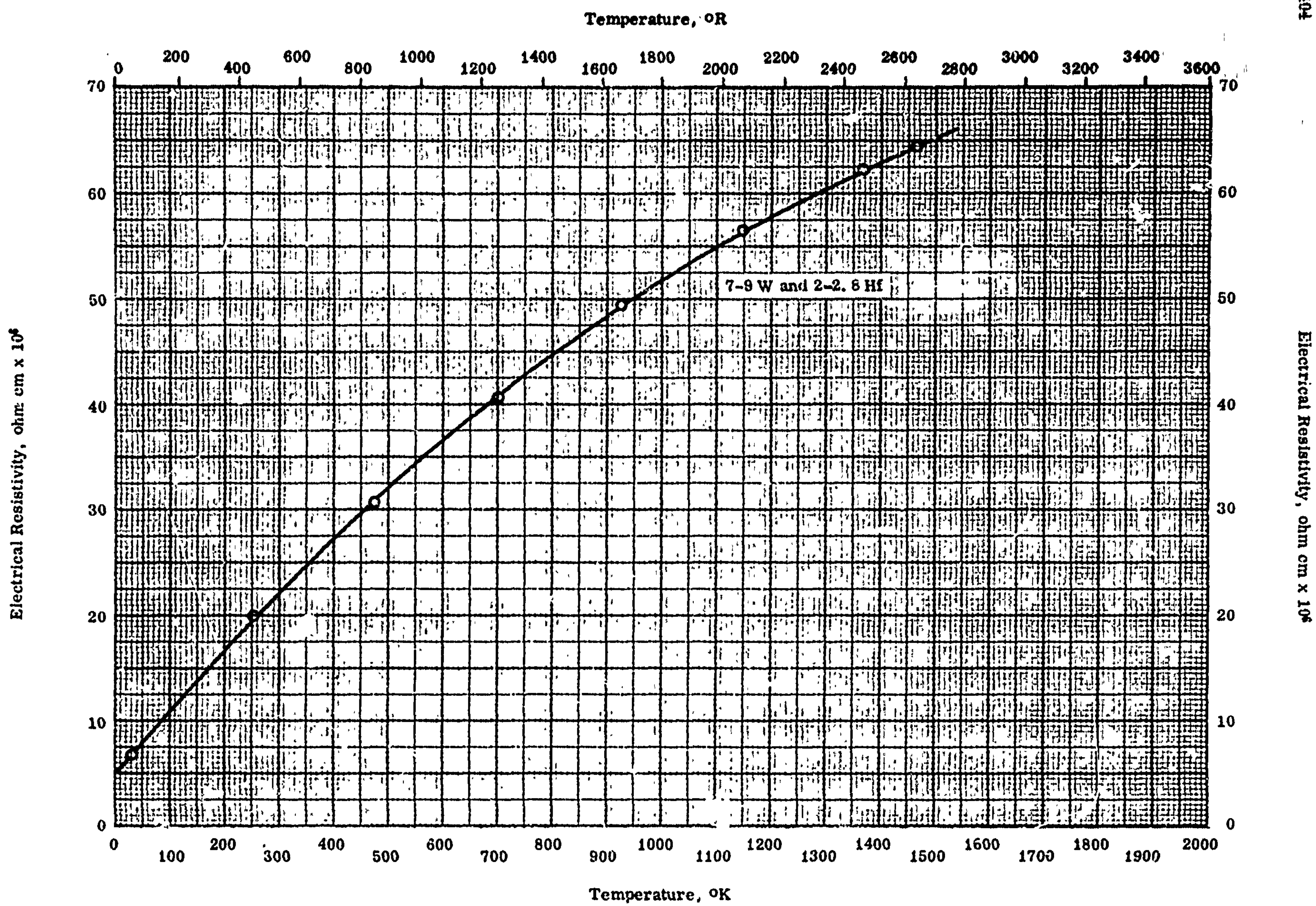
REPORTED VALUES

Melting Point:	K	R
O 8-9 W and 2-3 Hf	3256	5860

PROPERTIES OF TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	63-16	3256		Ta-8W-2Hf; 7-9 W, 2-2.8Hf, 0.003-0.01 O, 0.003-0.007 N, and 0.001-0.003 C; density 0.604 lb in^{-3}.	

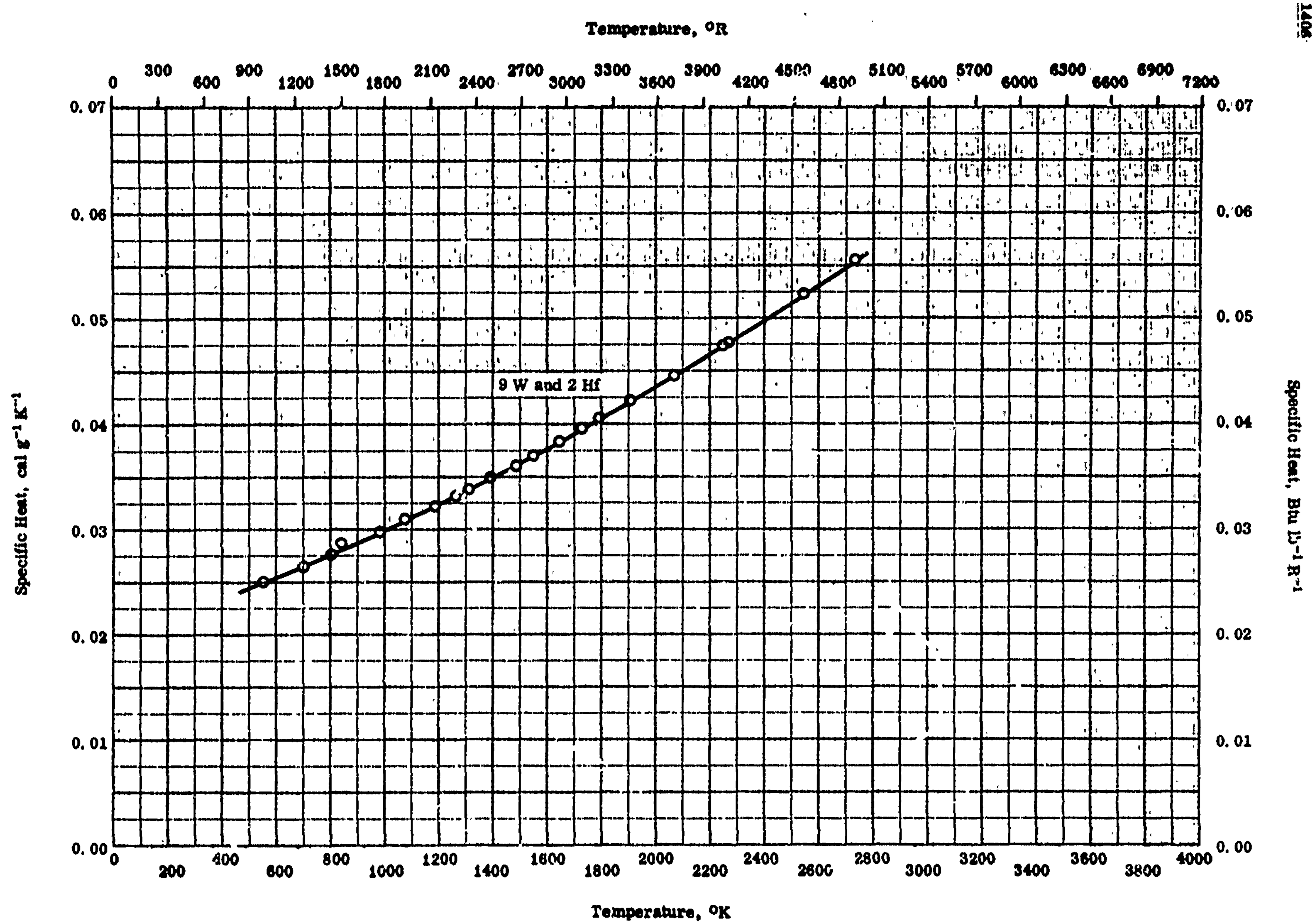


ELECTRICAL RESISTIVIT · TANTALUM + TUNGSTEN + ΣX_i

ELECTRICAL RESISTIVITY -- TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-16	33-1467		Ta-8W - 2 Hf; 7.0-9.0 W, 2.0-2.8 Hf, 0.003-0.01 O, 0.003-0.007 N, and 0.001-0.003 C; density 0.604 lb in^{-3}.	

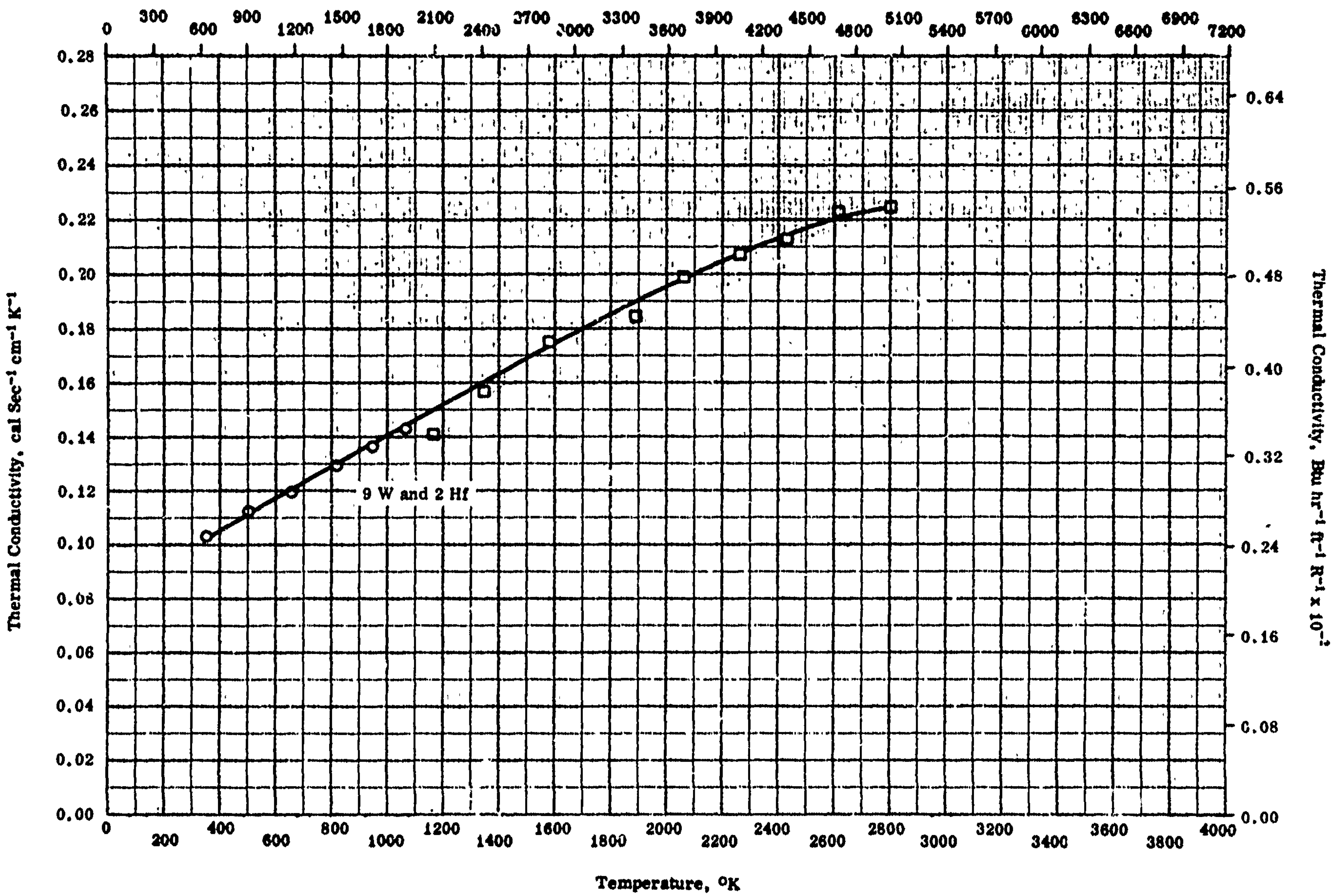


SPECIFIC HEAT -- TANTALUM + TUNGSTEN + ΣX_i

SPECIFIC HEAT -- TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	560-2730	±5.0	Ta - 8 W - 2 Hf alloy; 9.0 W, 2.2 Hf, 0.0041 C, 0.0040 O_2, and 0.0023 N_2; density 1058 lb ft^{-3}.	

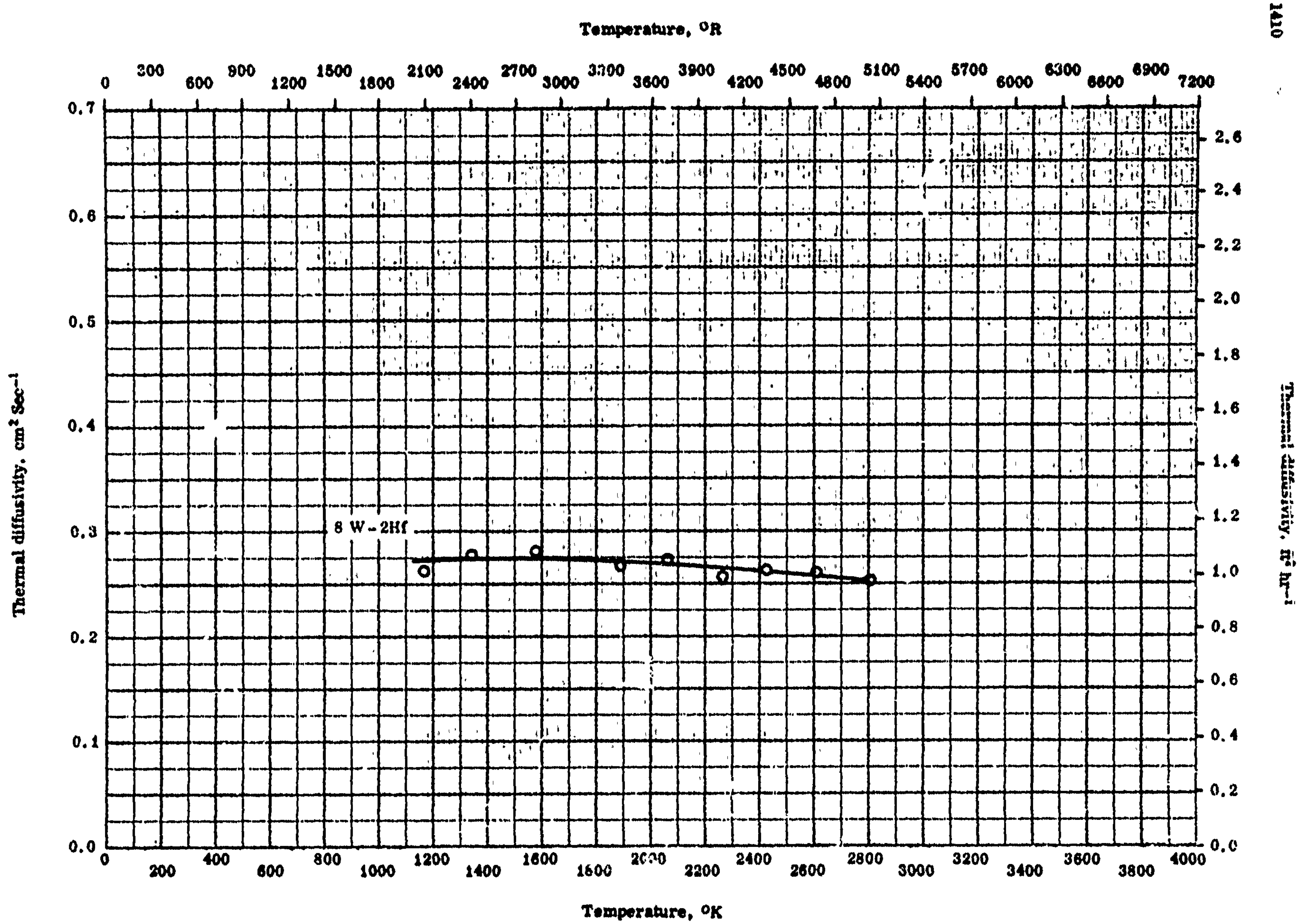


THERMAL CONDUCTIVITY -- TANTALUM + TUNGSTEN + ΣX_i

THERMAL CONDUCTIVITY -- TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	505-1072	±4	88.79 Ta, 9.0 W, 2.2 Hf, 0.0041 C, 0.0040 O_2, and 0.0023 N_2; density 1058 lb ft^{-3}.	End surface ground flat and parallel; measured in He atm.
□	63-1	1172-2803	±4	Same as above.	The above sample measured by another method.

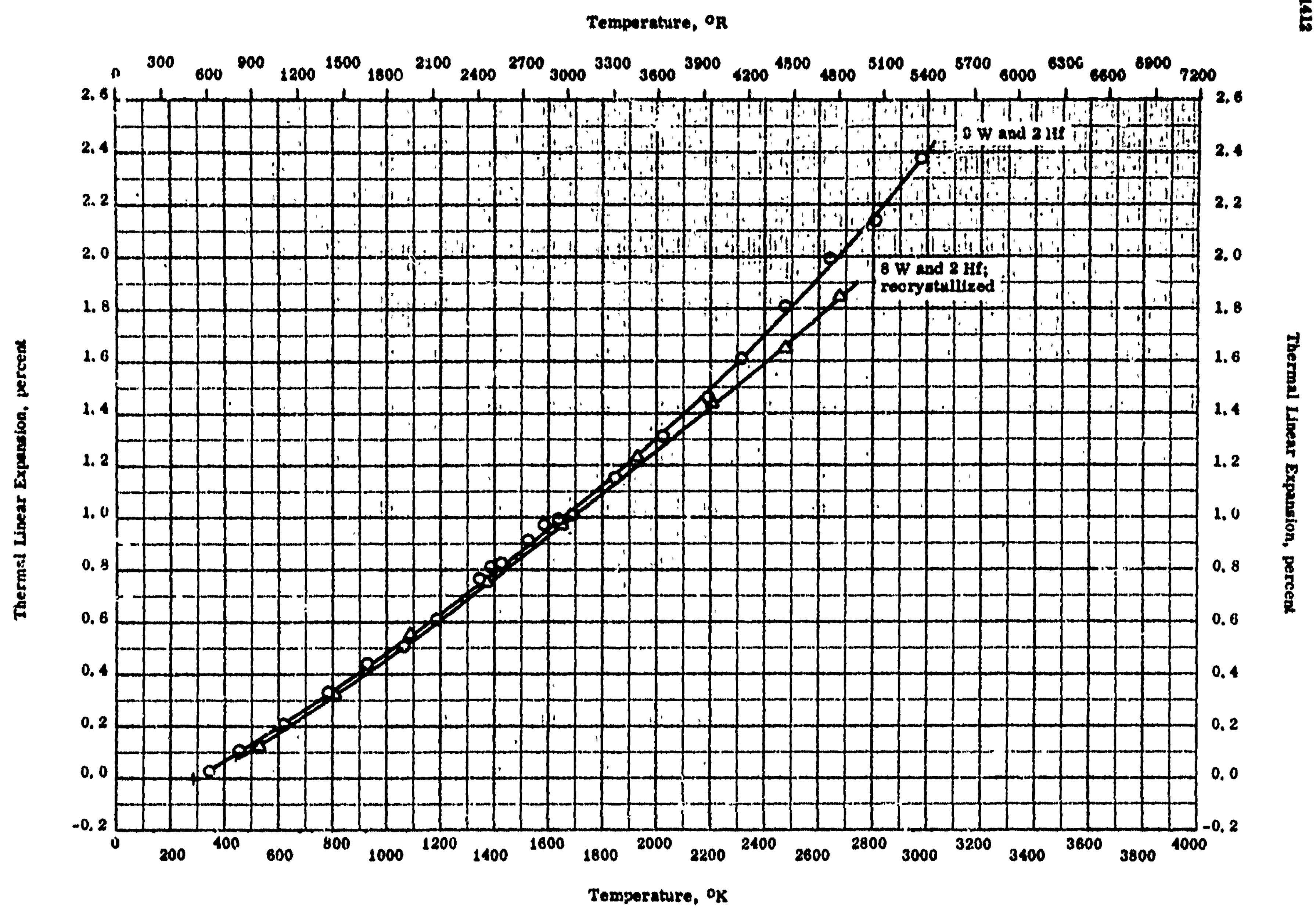


THERMAL DIFFUSIVITY -- TANTALUM + TUNGSTEN + ΣX_i

THERMAL DIFFUSIVITY -- TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-1	1172-2805		Ta-8 W-2 Hf; 9.0 W, 2.2 Hf, 0.0041 C, 0.0040 O_2, and 0.0023 N_2; density 16.95 g cm^{-3}.	Surface ground discs.



THERMAL LINEAR EXPANSION -- TANTALUM + TUNGSTEN + ΣX_i

THERMAL LINEAR EXPANSION -- TANTALUM + TUNGSTEN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-1	300-2973	2	Westinghouse Electric Corp.; 88.79 Ta, 9.0 W, 2.2 Hf, 0.0041 C, 0.0040 O, and 0.0023 N; density 1058 lb ft^{-3}; dimension 1/2 in. dia. by 6 in. long.	Measured in argon with heating rate of approx. 5 F min^{-1}.
△	63-26	300-2672		Westinghouse Electric Corp.; 90 Ta, 8 W, and 2 Hf; dimension 1/4 in. dia. by 2 in. long. [Author's design.: T-111].	Recrystallized; measured at a heating rate of 6.8 F min^{-1} in vacuum; no significant change in dimension observed after the measurement.

PROPERTIES OF TANTALUM + ZIRCONIUM + ΣX_i

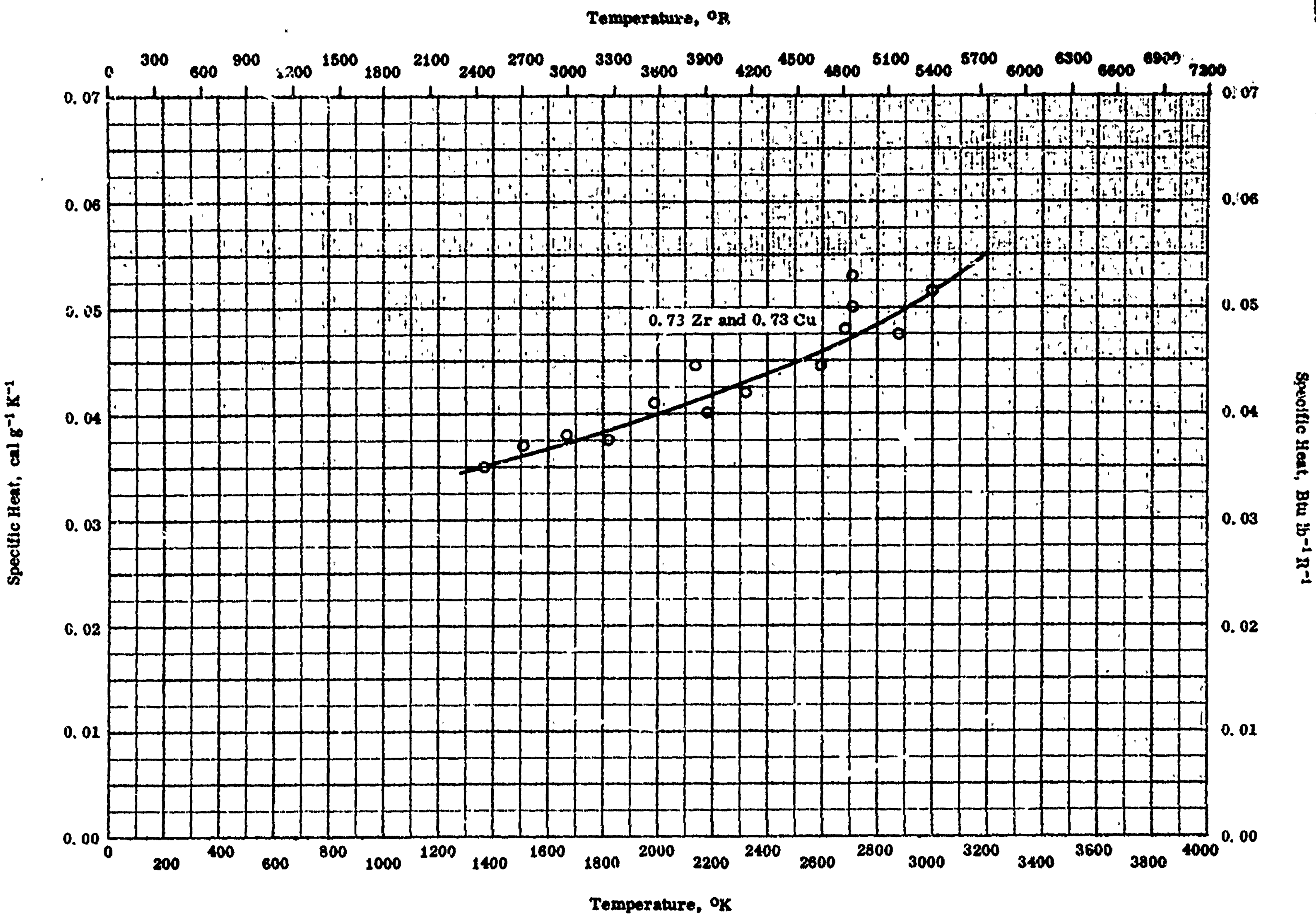
REPORTED VALUES

Density:	g cm^{-3}	lb in.$^{-3}$
O 0.73 Zr, 0.73 Cu, and 0.21 Fe	16.66	1040

PROPERTIES OF TANTALUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	56-7	298		0.73 each Zr and Cu, 0.2[illegible] Fe, 0.09 Ni, 0.08 C, 0.07 Co, 0.03 Mn, 0.02 Si, 0.017 Al, 0.0047 Cr and 0.0033 Ca.	Sintered, then swaged: letter from authors corrects error in original reference.

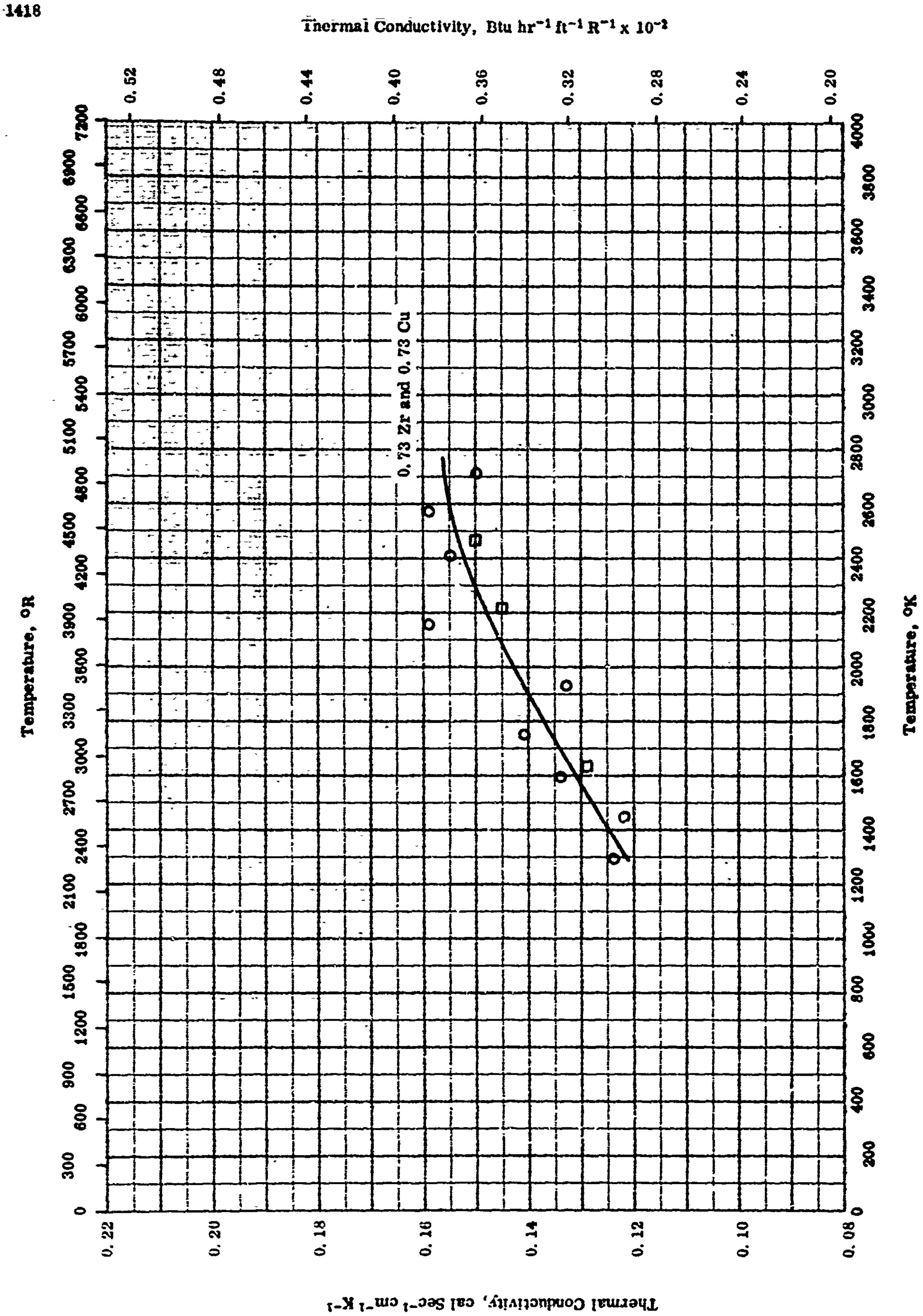


SPECIFIC HEAT -- TANTALUM + ZIRCONIUM + ΣX_i

SPECIFIC HEAT -- TANTALUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	56-7	1367-3000		Composition before test: 0.73 Zr, 0.73 Cu, 0.21 Fe, 0.09 Ni, 0.08 C, 0.07 Co, 0.03 Mn, 0.02 Si, 0.017 Al, 0.0047 Cr, and 0.0033 Ca, and after test: 0.015 C, 0.013 Si, 0.0023 Cr, 0.0019 Cu, and none of others; density 1040 lb ft^{-3}.	Sintered and swaged to given density.

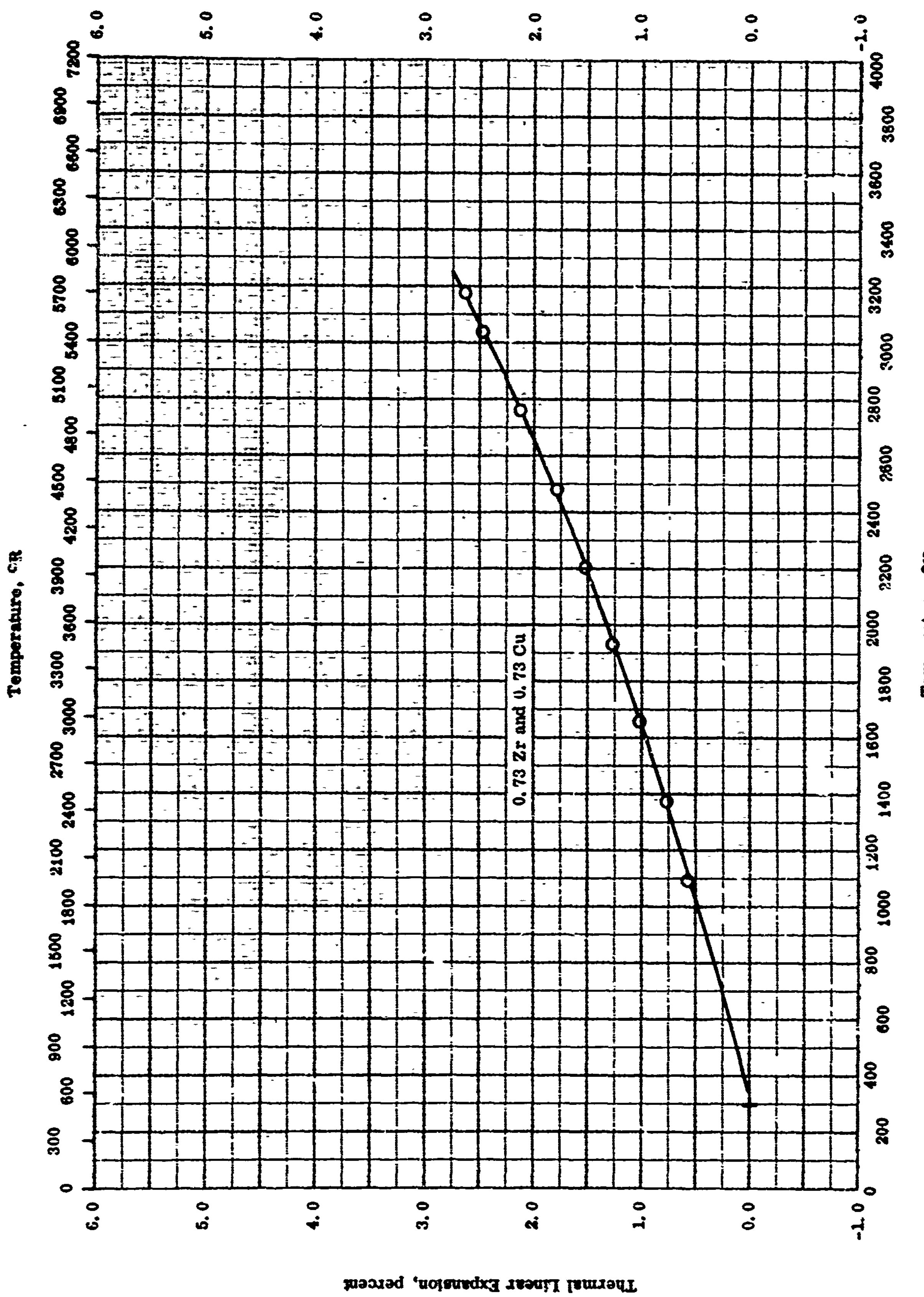


THERMAL CONDUCTIVITY -- TANTALUM + ZIRCONIUM + ΣX_i

THERMAL CONDUCTIVITY -- TANTALUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-7	1294-2733		Composition before test: 0.73 Zr, 0.73 Cu, 0.21 Fe, 0.09 Ni, 0.08 C, 0.07 Co, 0.03 Mn, 0.02 Si, 0.017 Al, 0.0047 Cr, and 0.0033 Ca; and after test: 0.015 C, 0.013 Si, 0.0023 Cr, and 0.0019 Cu; density 1040 lb ft^{-3}.	Sintered; swaged to give density; heating.
□	56-7	1552-2467		Same as above.	Same as above except measured during cooling.



THERMAL LINEAR EXPANSION -- TANTALUM + ZIRCONIUM + ΣX_i

THERMAL LINEAR EXPANSION -- TANTALUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-7	1089-3172		Before test: 0.73 Zr, 0.73 Cu, 0.21 Fe, 0.090 Ni, 0.080 C, 0.070 Co, 0.030 Mn, 0.020 Si, 0.004 Cr, 0.0033 Ca, and no Ti; after test: 0.0150 C, 0.013 Si, 0.0023 Cr, 0.0019 Cu and none of others; density 1040 lb ft^{-3}.	Pressed, sintered, and swaged to given density; data shown are smoothed; taken during second heating and cooling cycle; letter from author indicates error in original reference which gives density 14.6 g cm^{-3}, corrected density 16.66 g cm^{-3}.

PROPERTIES OF THORIUM + URANIUM + ΣX_i

REPORTED VALUES

Melting Point:	K	R
○ 28.6 U and 21.4 Zr	1508	2714
□ 33.3 U and 33.3 Zr	1477	2659

PROPERTIES OF THORIUM + URANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-14	1508		49.8 Th, 28.6 U, and 21.4 Zr.	M. P. by observing the first liquid drop, optical pyrometer sighting on black body cavity.
□	50-14	1477		33.3 each Th, U, and Zr.	Same as above.

PROPERTIES OF THORIUM + ZIRCONIUM + ΣX_i

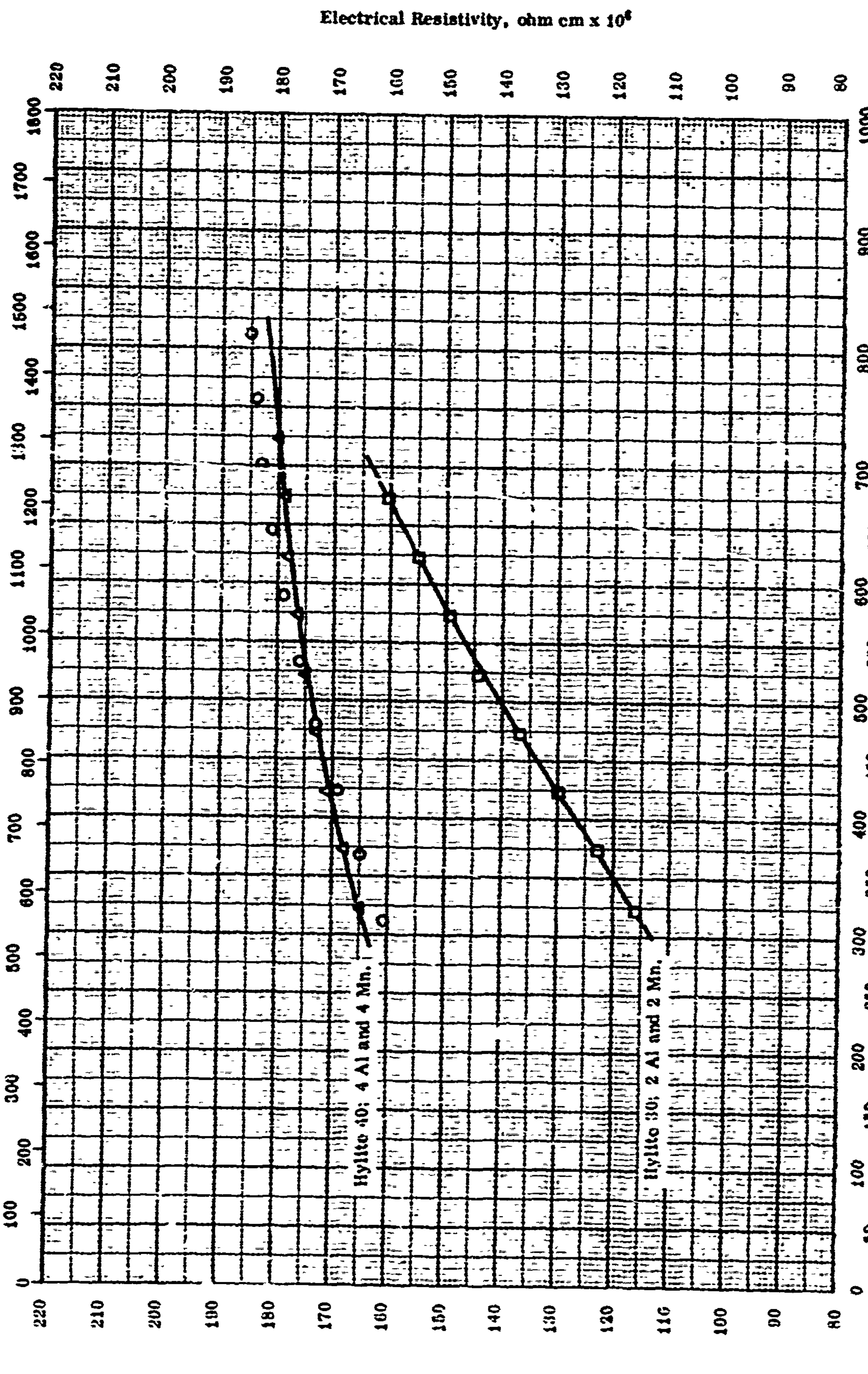
REPORTED VALUES

Melting Point:		K	R
○	27.6 Zr and 11.0 U	1533	2759
□	25.0 and 17 U	1530	2754
△	33.3 Zr and 33.3 U	1744	2659

PROPERTIES OF THORIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-14	1533		61.4 Th, 27.6 Zr, and 11.0 U.	Observation of first liquid drop.
□	50-14	1530		58.1 Th, 25.0 Zr, and 16.9 U.	Same as above.
△	50-14	1477		33.3 each Th, Zr, and U.	Same as above.

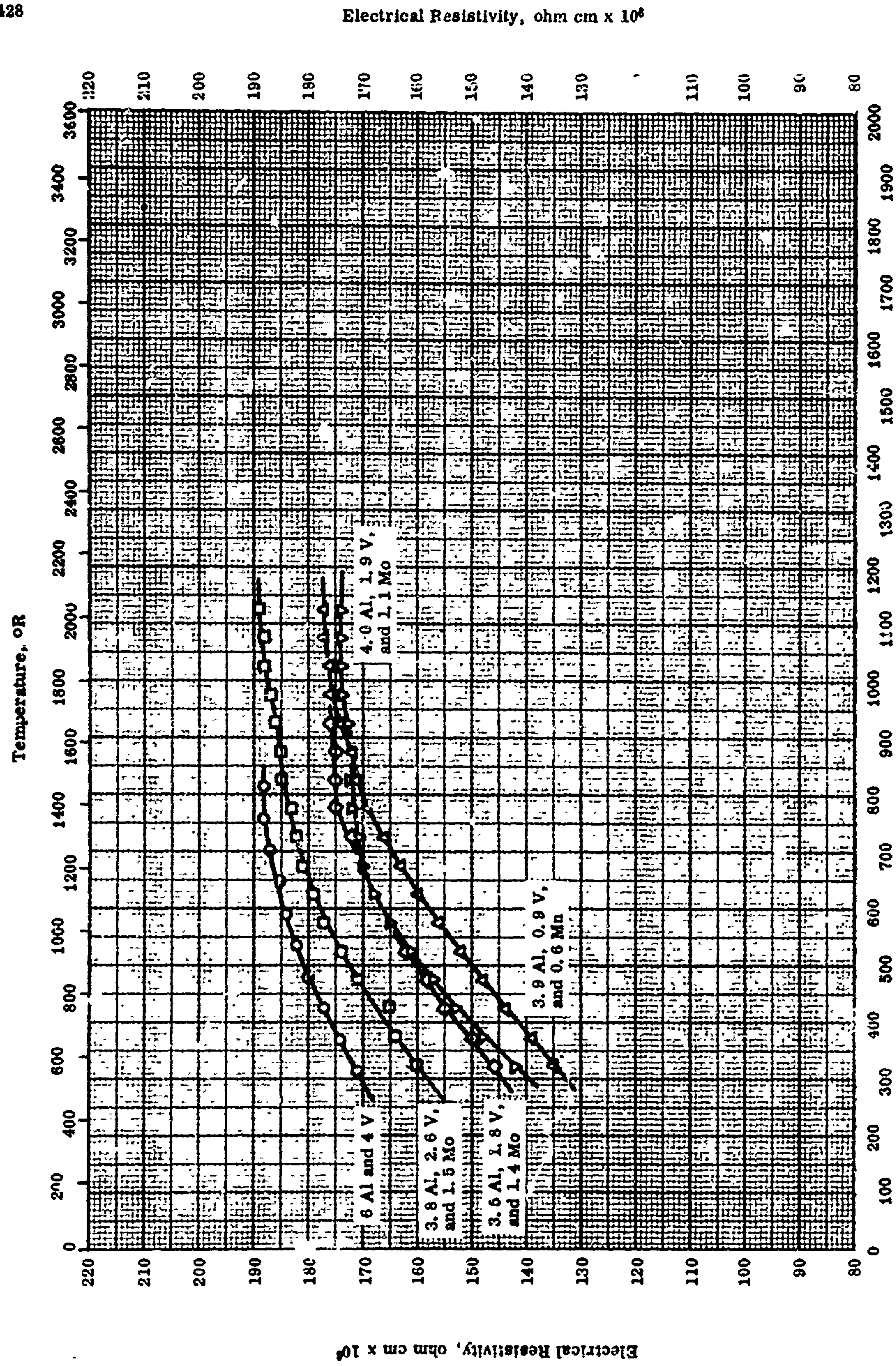


ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(2 - 4 Al and 2 - 4 Mn)

ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(2 - 4 Al and 2 - 4 Mn)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811	±1	C-130 AM (Formerly RC-130B) ; nominal: 4 Al and 4 Mn.	Mill-annealed.
□	61-10	323-673		Hylite 30; 2.0 Al, 2.0 Mn, and 0.015 > H_2.	
△	61-10	323-723		Hylite 40; 4.0 Al, 4.0 Mn, and 0.015 > H_2.	

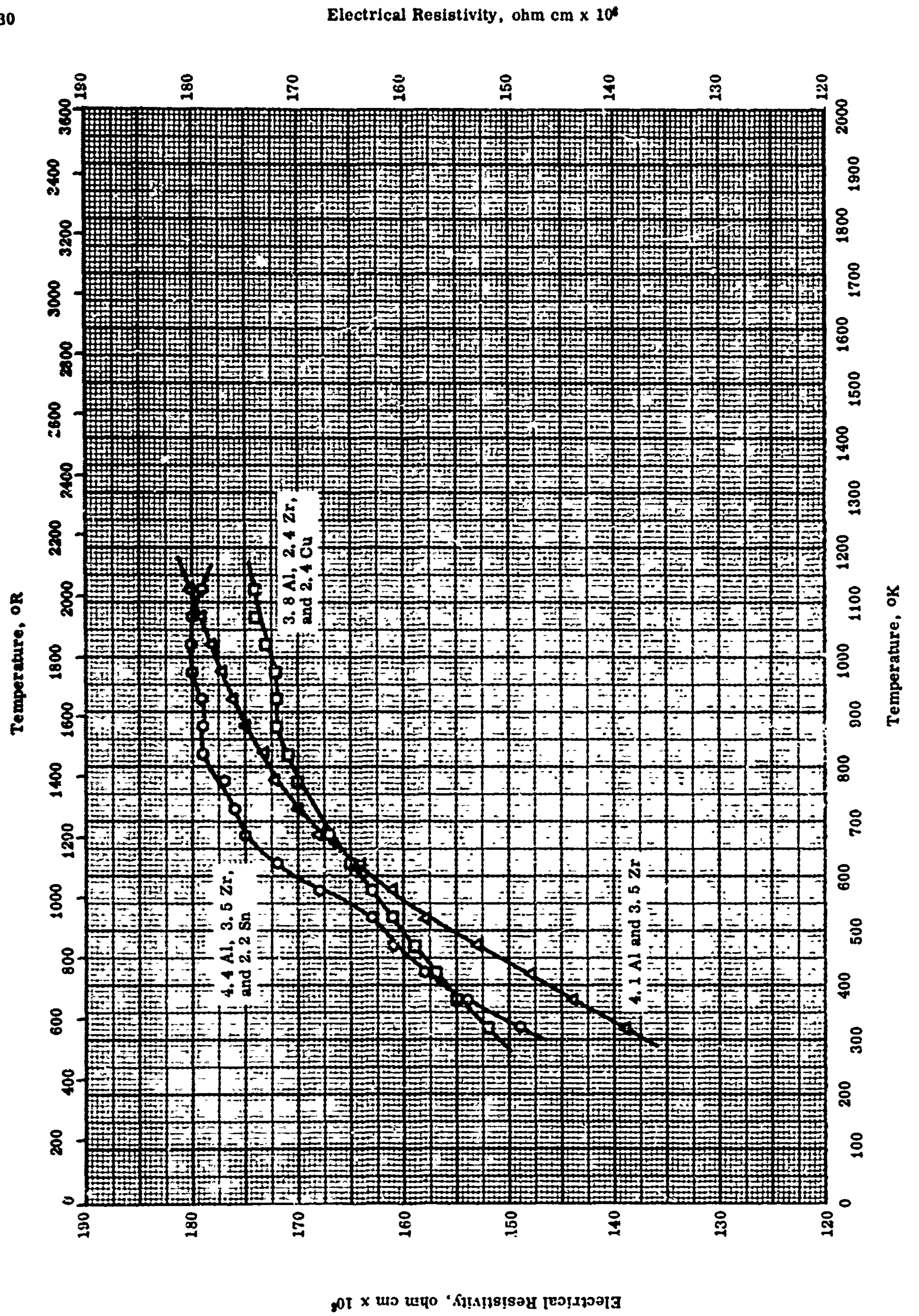


ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3-6 Al and 0.9-4 V)

ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3-6 Al and 0.9-4 V)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811		Ti - 6 Al - 4 V; nominal: 6 Al and 4 V.	Mild annealed.
□	61-11	323-1123		3.8 Al, 2.6 V, and 1.5 Mo.	
△	61-11	323-1123		3.9 Al, 0.9 V, and 0.6 Mo.	
▽	61-11	323-1123		4.0 Al, 1.9 V, and 1.1 Mo.	
◇	61-11	323-1073		3.5 Al, 1.8 V, and 1.4 Mo.	

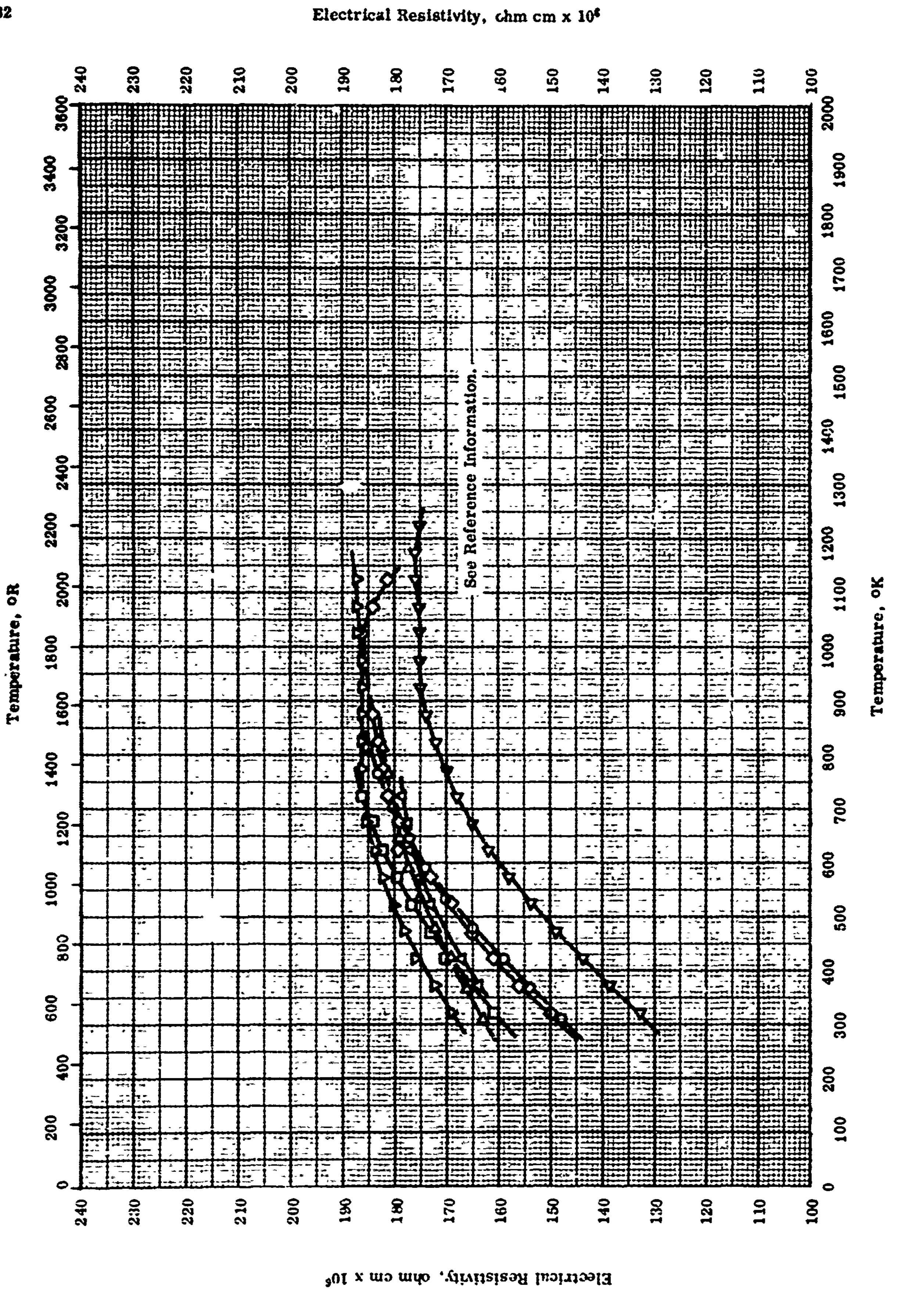


ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3.8-4.4 Al and 2.4-3.5 Zr)

ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3.8-4.4 Al and 2.4-3.5 Zr)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-11	323-1123		4.4 Al, 3.5 Zr, and 2.2 Sn.	
□	61-11	323-1123		3.8 Al, 2.4 Zr, and 2.4 Cu.	
△	61-11	323-1123		4.1 Al and 3.5 Zr.	

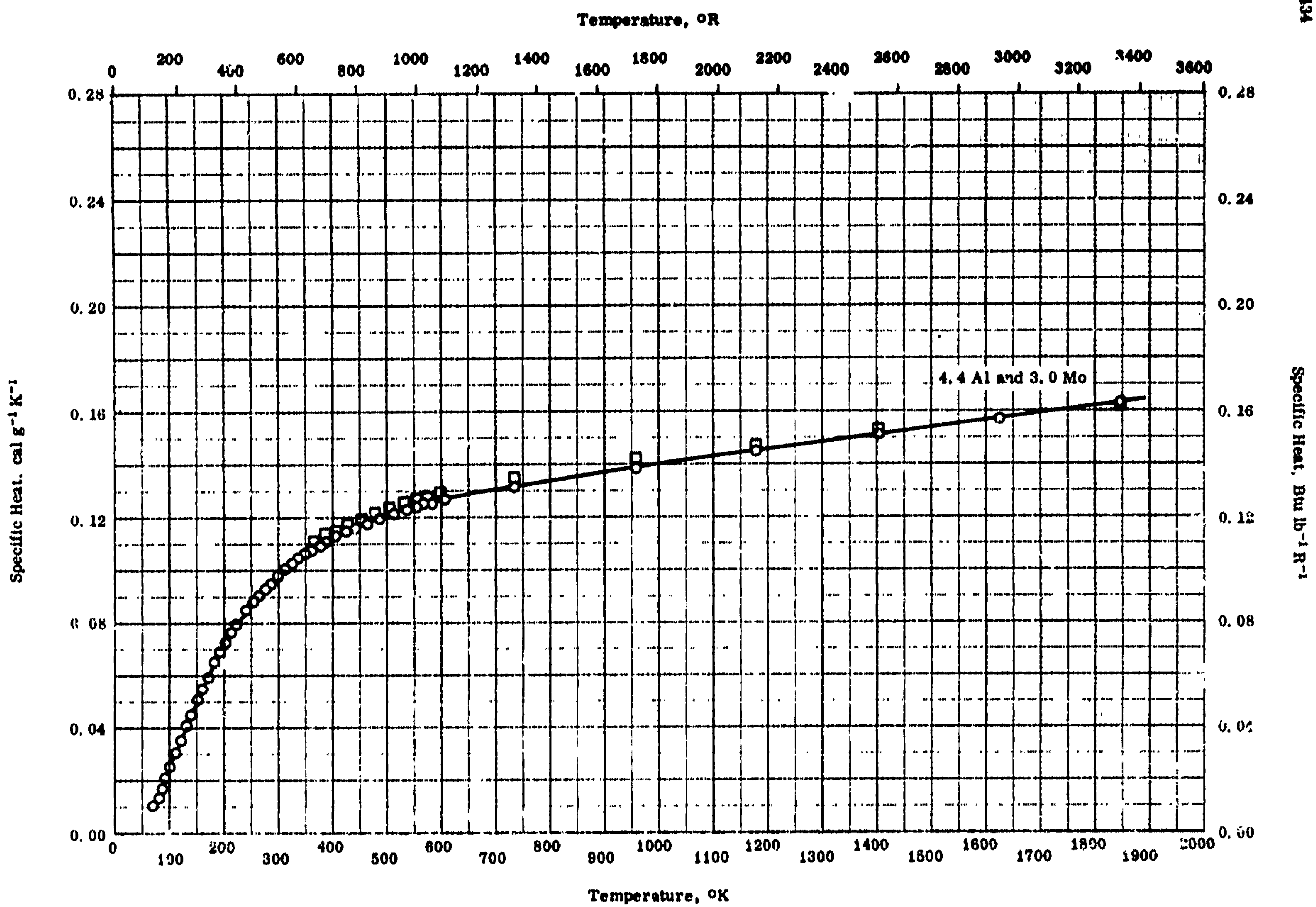


ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i

ELECTRICAL RESISTIVITY -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811	±1	A-110 AT; nominal: 5 Al and 2.5 Sn.	In a mild-annealed condition.
□	61-10	[illegible]23-723		Hylite 20; Al, 2.5 Sn, and 0.015 > H_2.	
△	61-10	323-723		Hylite 50; 4.0 Al, 4.0 Mo, 2.0 Sn, 0.5 Si, and 0.015 > H_2.	
▽	61-11	323-1123		3.8 Al, 2.7 Sn, and 2.2 Cu.	
◇	61-11	323-1123		3.7 Al, 2.5 Sn, and 2.1 V.	
◁	61-11	323-1223		4.0 Al and 1.5 Mo.	
▷	58-14	311-811	±1	Ti-155 A; nominal: 5 Al, 1.5 Fe, 1.4 Cr, and 1.2 Mo.	In a mild-annealed condition.

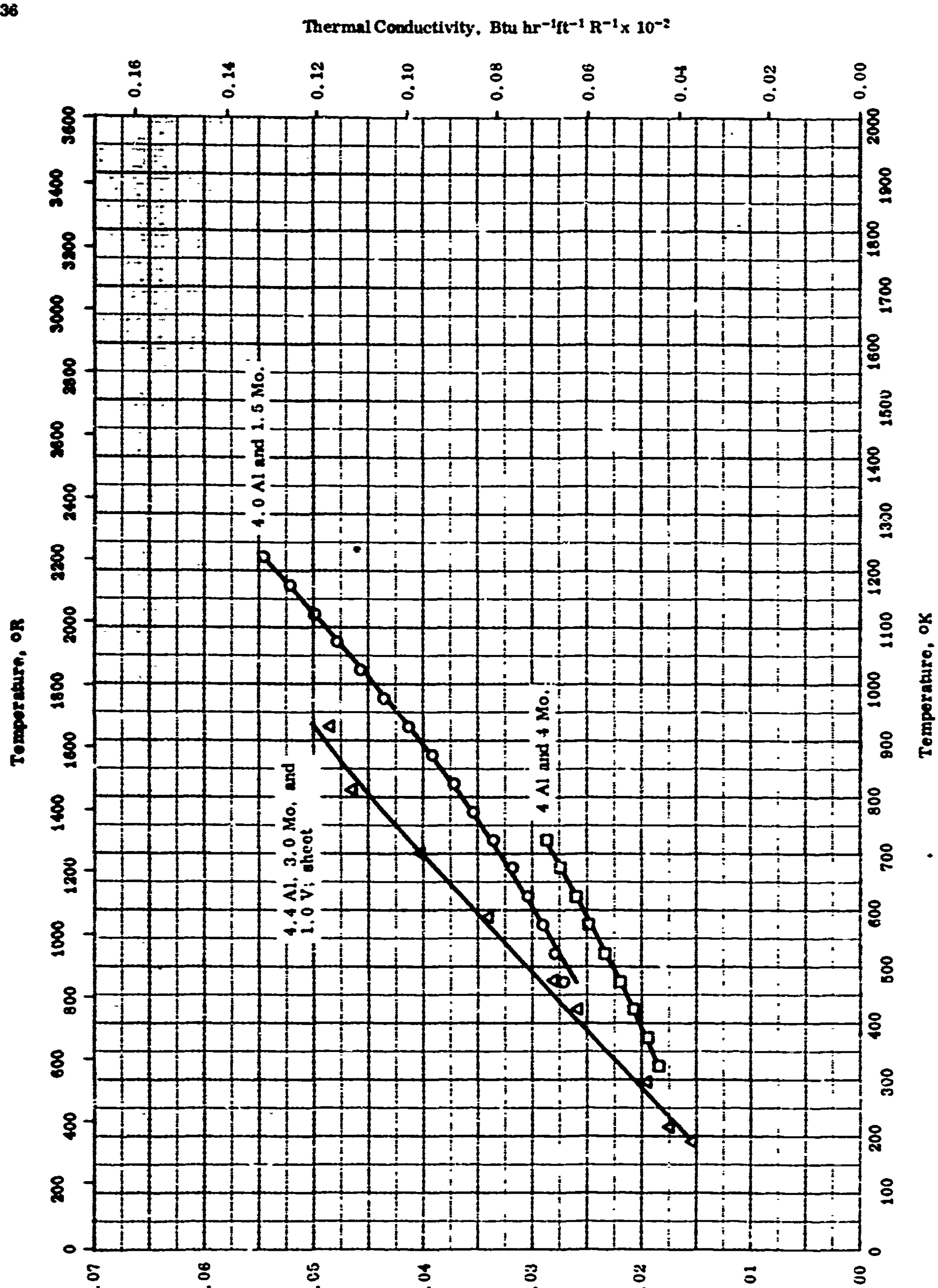


SPECIFIC HEAT -- TITANIUM + ALUMINUM + ΣX_i

SPECIFIC HEAT -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-17	80-1800	< 2.0	4 Al-3 Mo-1 V titanium alloy; 4.4 Al, 3.0 Mo, 1.0 V, 0.10 Fe, 0.03 C, 0.011 N_2, and 0.0057 H_2.	Solution heat treated at 1655 F and aged at 925 F for 12 hrs.
□	61-17	80-1800	< 2.0	6 Al-4 V titanium alloy; 5.89 Al, 3.87 V, 0.15 Fe, 0.02 C, 0.015 N_2, and 0.0050 H_2.	Solution heat treated at 1700 F for 20 min, oil quenched and aged at 900 F for 4 hrs and then cooled in air.

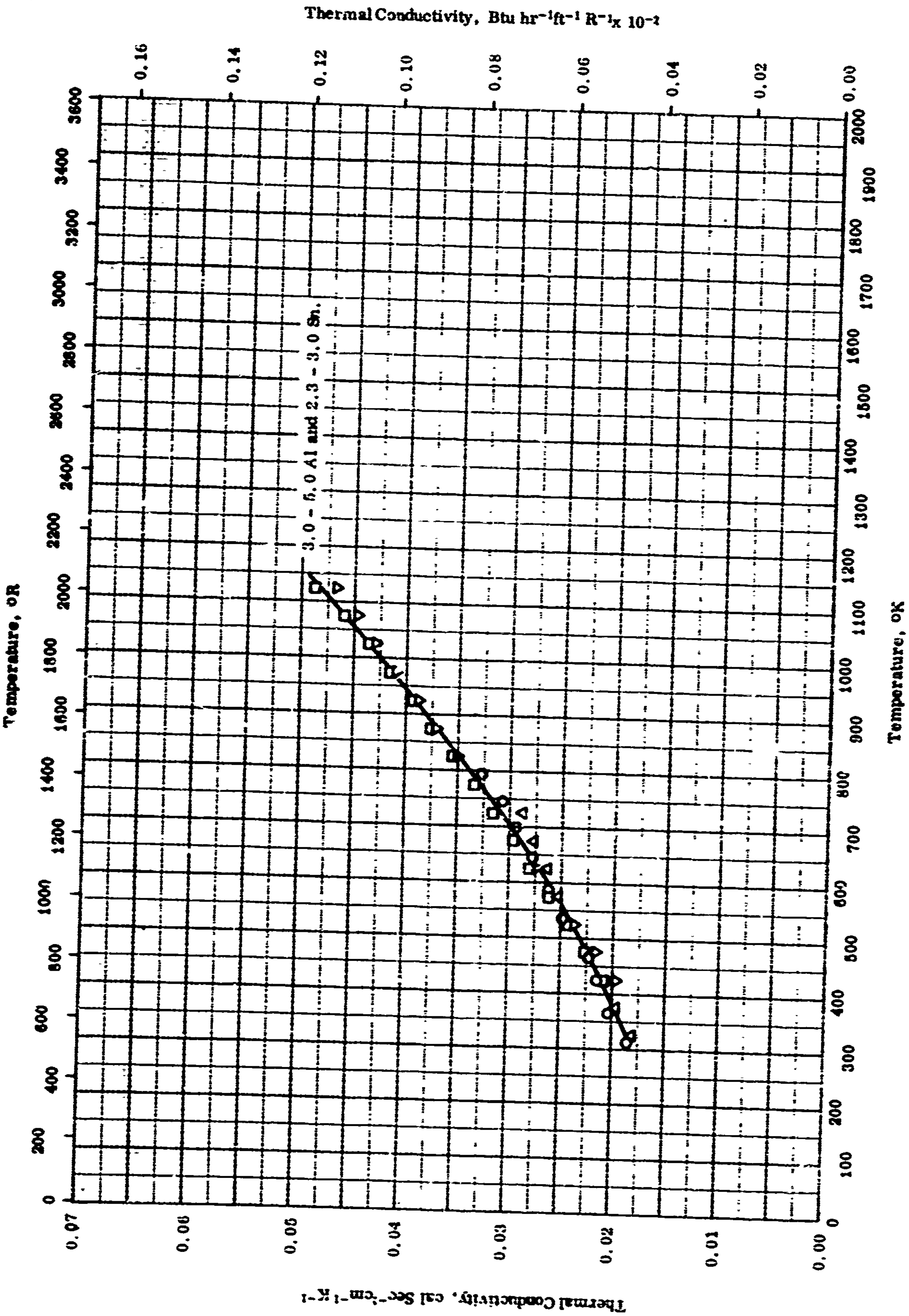


THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(4.0-4.5 Al and 1.5-4.0 Mo)

THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(4.0-4.5 Al and 1.5-4.0 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-11	473-1223		4.0 Al and 1.5 Mo.	
□	61-10	323-723		Hylite 50 from Jessop-Saville LTD.; 4 Al, 4 Mo, 2 Sn, 0.5 Si, and 0.015 H_2.	
△	62-11	190-922		Crucible heat no. R 6736 sheet no. B-32; 4.4 Al, 3.0 Mo, 1.0 V, 0.1 Fe, 0.03 C, 0.011 N_2, and 0.0057 H_2.	

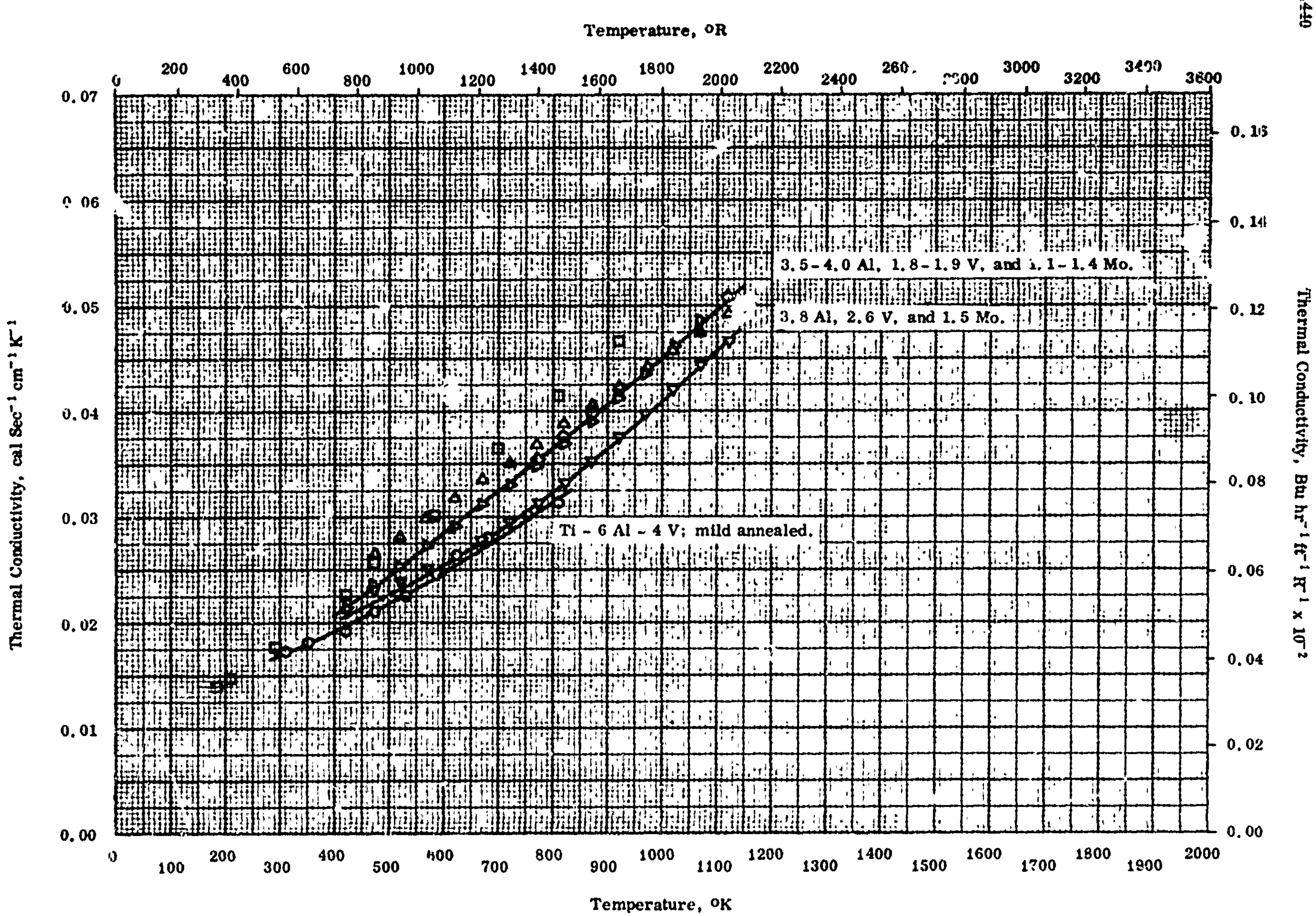


THERMAL CONDUCTIVITY — TITANIUM + ALUMINUM + ΣX_i
(3.0-6.0 Al and 2.0-3.0 Sn)

THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3.0-5.0 Al and 2.0-3.0 Sn)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811	±5	A - 110 AT; 5 Al and 2.5 Sn; nominal composition.	In a mild annealed condition.
□	61-11	423-1123		3.7 Al, 2.5 Sn, and 2.1 V.	
△	61-10	323-723		Hylite 20 from Jessop-Saville LTD.; 5 Al, 2.5 Sn, and 0.015 H_2.	
▽	61-11	423-1123		3.8 Al, 2.7 Sn., and 2.2 Cu.	

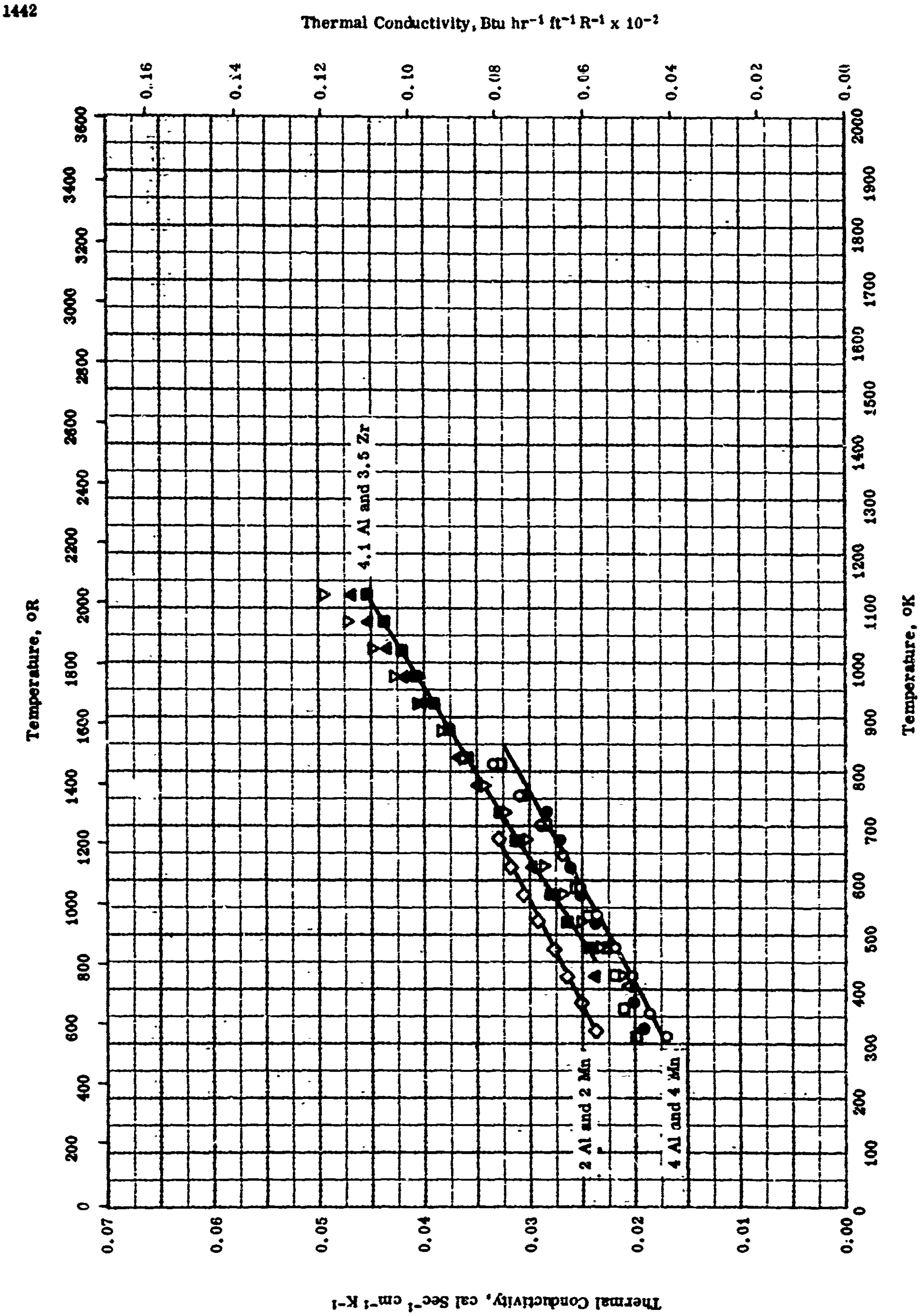


THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3.5 - 6.0 Al and 0.9 - 4.0 V)

THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i
(3.5-6.0 Al and 0.9-4.0 V)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811	± 5	Ti - 6 Al - 4 V.	In a mild annealed condition.
□	62-11	188-922		Ti - 6 Al - 4 V sheet no. 1777 A-1; 5.89 Al, 3.87 V, 0.15 Fe, 0.02 C, 0.015 N_2, and 0.005 H_2.	
△	61-11	473-1123		3.9 Al, 0.9 V, and 0.6 Mo.	
▽	61-11	473-1123		3.8 Al, 2.6 V, and 1.5 Mo.	
▷	61-11	423-1073		3.5 Al, 1.8 V, and 1.4 Mo.	
◇	61-11	423-1123		4.0 Al, 1.9 V, and 1.1 Mo.	

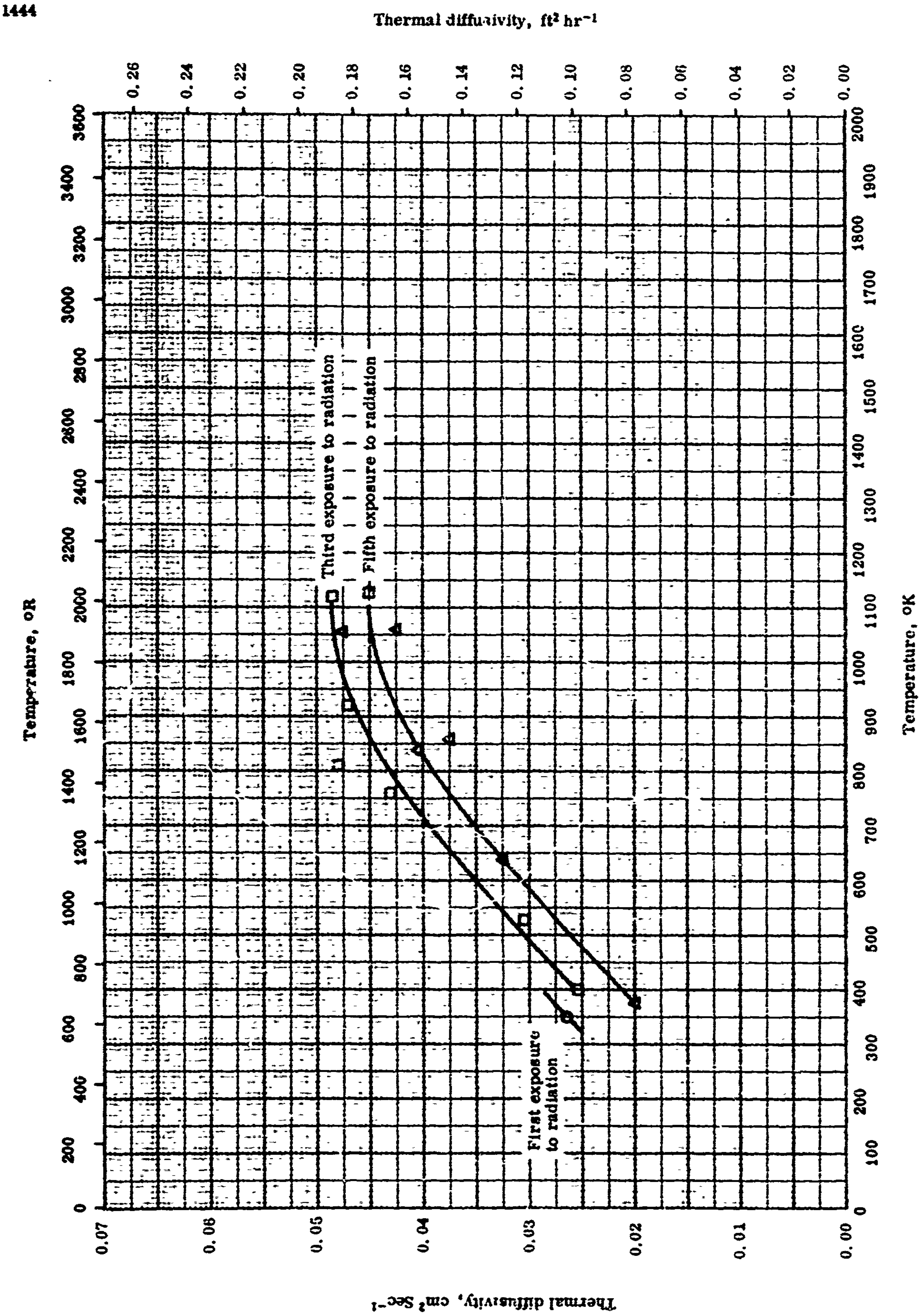


THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i

THERMAL CONDUCTIVITY -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-14	311-811	± 5	C - 130 AM (formerly RC - 130B); 4 Al and 4 Mn; nominal composition.	In a mild annealed condition.
□	58-14	311-811	± 5	Ti - 155 A; 5 Al, 1.5 Fe, 1.4 Cr, and 1.2 Mo; nominal composition.	Same as above.
△	58-14	408		7 Al and 0.5 Si.	
▽	61-11	423-1123		4.4 Al, 3.5 Cu, and 2.2 Sn.	
◇	61-10	323-673		Hylite 30 from Jessop-Saville LTD.; 2 Al, 2 Mn, and 0.015 H_2.	
●	61-10	323-723		Hylite 40 from Jessop-Saville LTD.; 4 Al, 4 Mn, and 0.015 H_2.	
■	61-11	423-1123		4.1 Al and 3.5 Zr.	
▲	61-1[illegible]	423-1123		3.8 Al, 2.4 Zr, and 2.4 Cu.	

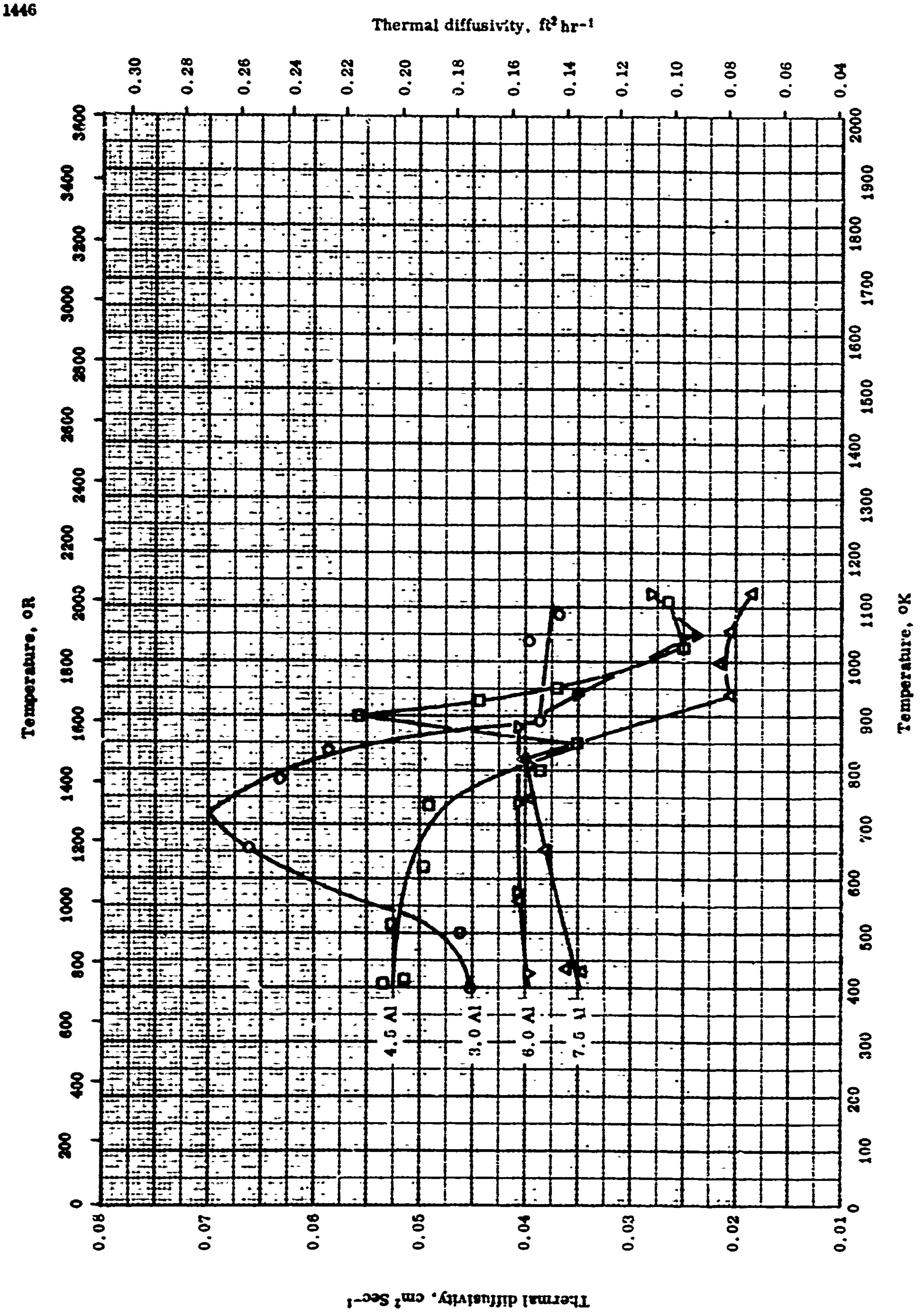


THERMAL DIFFUSIVITY -- TITANIUM + ALUMINUM + ΣX_i
(6 Al - 4 V)

THERMAL DIFFUSIVITY -- TITANIUM + ALUMINUM + ΣX_i
(6 Al - 4 V)

REFERENCE INFORMATION

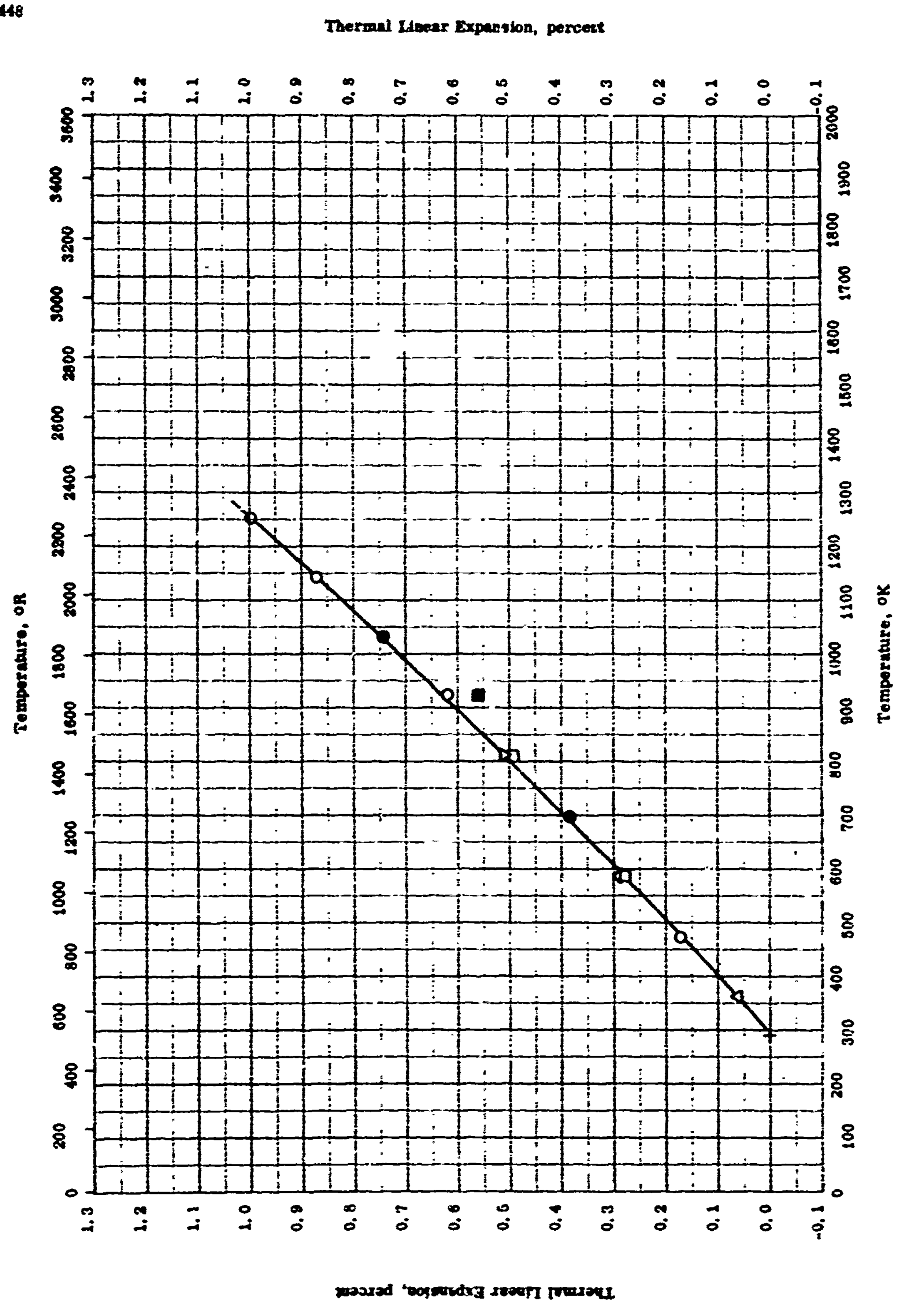
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-1	348		6 Al-4 V; nominal composition.	Exposed to radiation and followed by cooling.
□	57-1	398-1123		Same as above.	Measured after three exposures to radiation.
△	57-1	373-1058		Same as above.	Measured after five exposures to radiation.



THERMAL DIFFUSIVITY -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-2	396-1083		3.0 Al and 2.5 total Cr, Fe, Si, and B; cylindrical sample with 3 mm dia and 300 mm long.	Vacuum annealed for 5 hrs at 720 C and again annealed in the apparatus before begining measurement.
□	62-2	403-1110		4.5 Al and 2.5 total Cr, Fe, Si, and B; same dimensions as above.	Same as above.
△	62-2	428-1126		6.0 Al and 2.5 total Cr, Fe, Si, and B; same dimensions as above.	Same as above.
▽	62-2	423-1123		7.5 Al and 2.5 total Cr, Fe, Si, and B; same dimensions as above.	Same as above.

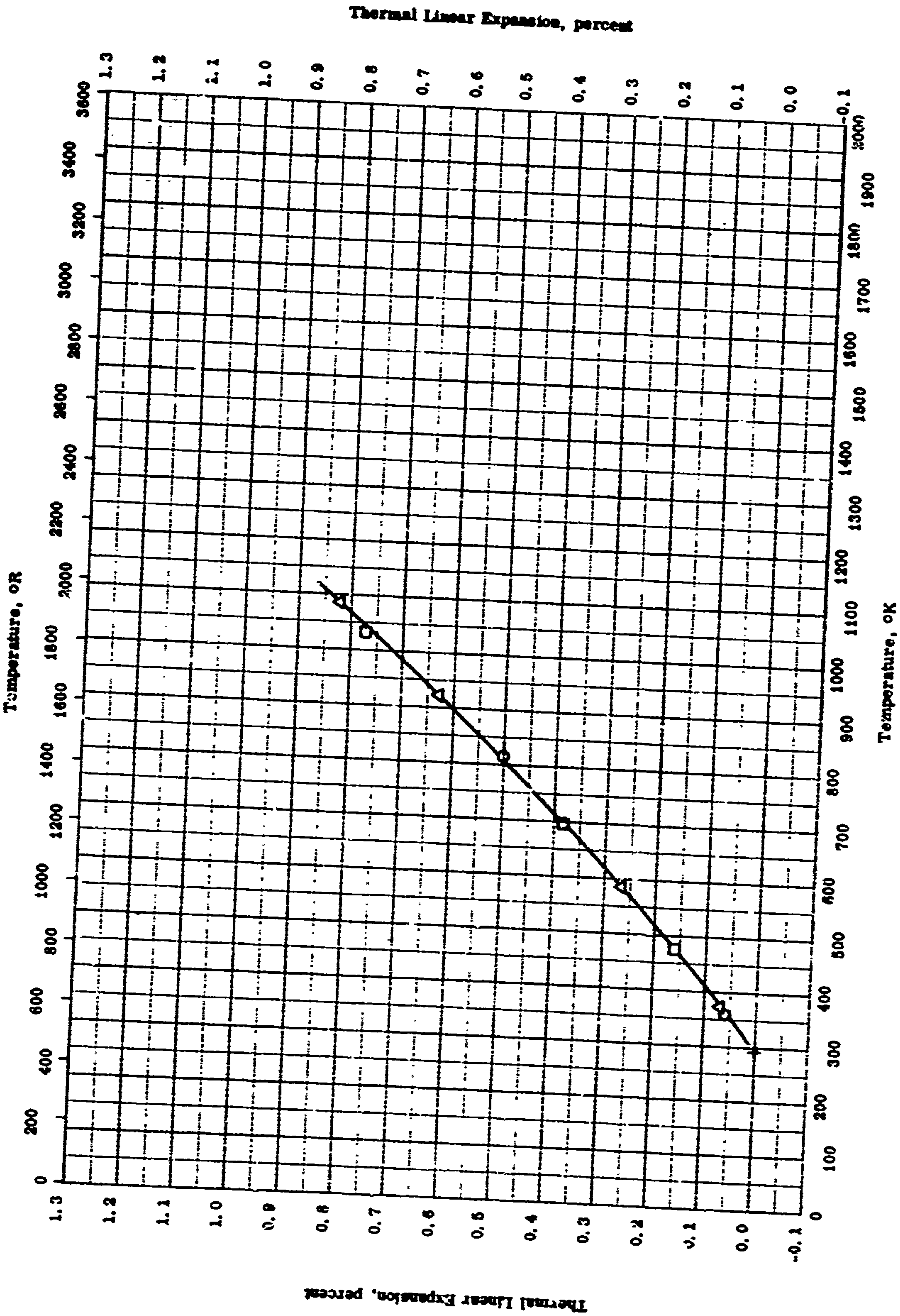


THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
($5 \leq Al < 8$)

THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
($5 \leq Al < 8$)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-31	293-1255		Crucible A-110 AT; 5 Al and 2.5 Sn; nominal composition.	
□	63-29	293-811		5 Al and 2.5 Sn; density 4.46 - 4.48 g cm^{-3}; alpha phase.	
△	63-29	293-811		Same as above except low oxygen content.	
▽	63-29	293-811		5 Al, 2.75 Cr, and 1.25 Fe; density 4.48 - 5.51 g cm^{-3}; alpha-beta alloy.	
◇	63-29	293-811		5 Al, 1.5 Fe, 1.4 Cr, and 1.2 Mo; density 4.48 - 4.51 g cm^{-3}; alpha-beta alloy.	
●	54-33	293-1144		A110 AT; 5 Al and 5 Sn.	
■	65-6	273-932		RMI - 7 Al - 2 Nb - 1 Ta; Reactive Metals, Inc.; 6.6 - 7.3 Al, 2 Nb, 1 Ta, 0.20 Fe, 0.080 O, and 0.04 C; density 0.160 lb in^{-3} and approx melting point 3000 F; alpha alloy with beta transus 1880 ± 25 F.	Fully annealed at 1650 F for 1 hr and air-cooled; stress relief at 1000 - 1200 F for 1/4 - 1 hr and air-cooled; forging blocking at 1850 - 1950 F and finishing 1800 - 1850 F.

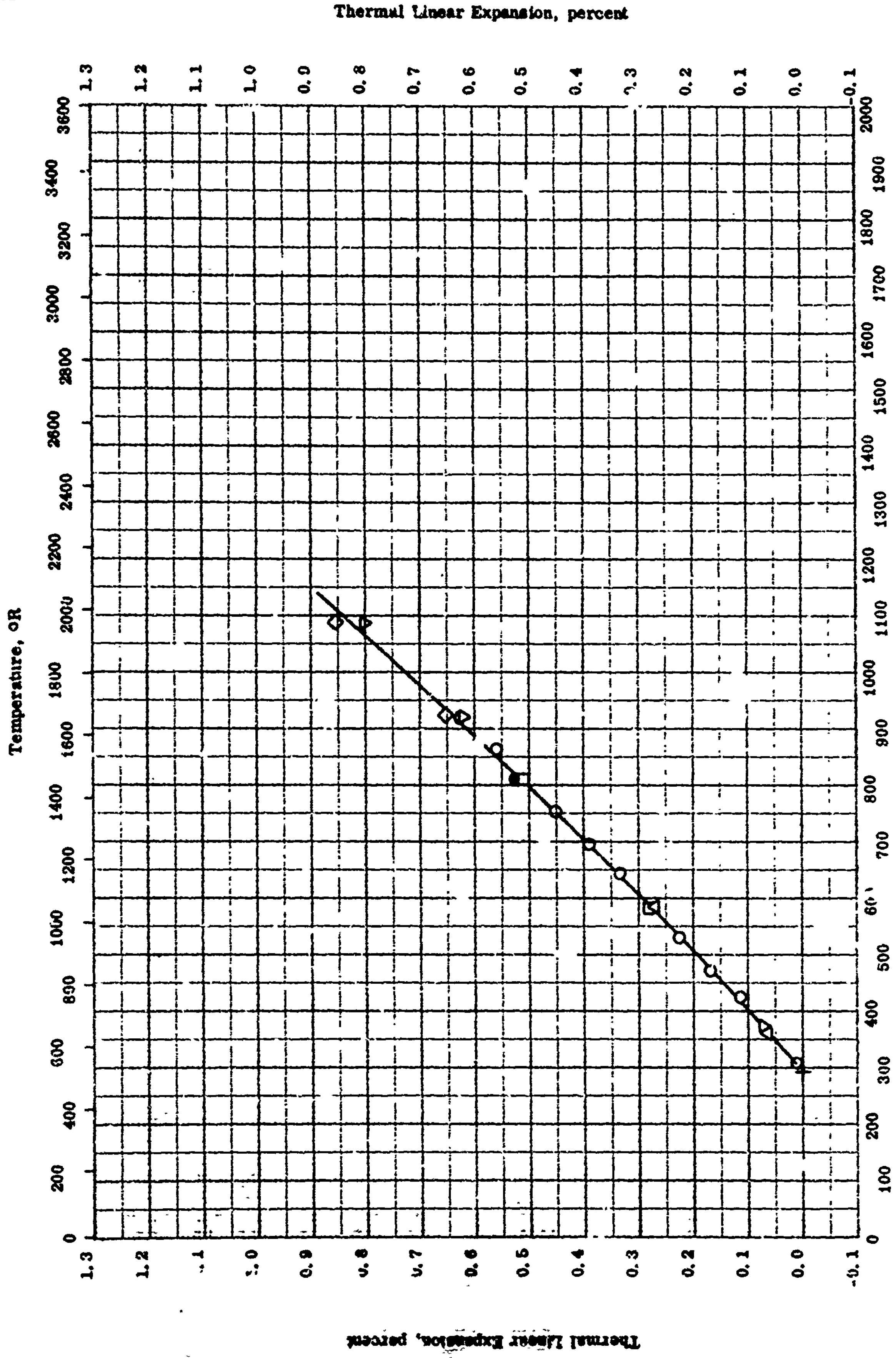


THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(3.5 - 4.5 Al and 3.5 - 4.5 Mn)

THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(3.5 - 4.5 Al and 3.5 - 4.5 Mn)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	63-20	293-811		4 Al and 4 Mn; density 4.5118 g cm^{-3}; alpha-beta body.	
□	64-33	293-1033		RC-130 B; 4 Al and 4 Mn.	
△	65-6	273-1089		RMI - 4 Al - 4 Mn; Reactive Metals, Inc.; 3.5 - 4.5 Al, 3.5 - 4.5 Mn, 0.40 Fe, 0.20 O, 0.08 C, 0.04 Ni, and 0.0100 - 0.0125 H; density 0.163 lb $in.^{-3}$ and approx melting point 3000 F; alpha-beta alloy with beta transus 1750 ± 25 F.	

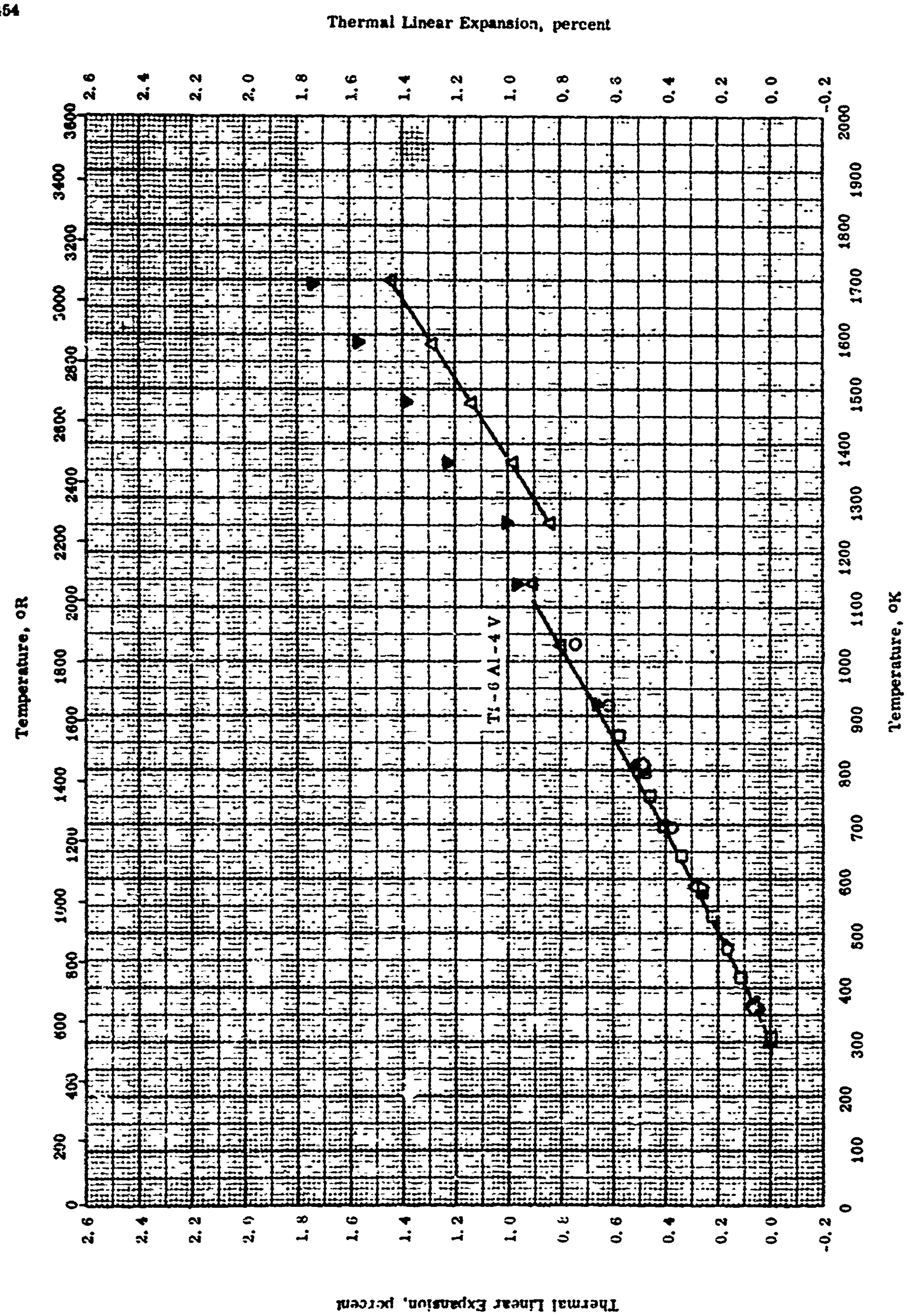


THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(3 - 8 Al and 1 - 5 Mo)

THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(3 - 8 Al and 1 - 5 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-28	311-922	<3	Crucible (heat No. R6736 and sheet No. B-32); 4.4 Al, 3 Mo, 1.0 V, 1.0 Fe, 0.03 C, 0.011 N, and 0.0057 H; sample 0.1 in. in dia and 1.968 in. in length.	Machined from 0.125 in. sheet parallel to grain direction; solution treated at 1655 F for 15 - 30 min, oil-quenched, aged at 925 F for 12 hrs, and air-cooled; average data of three samples.
□	63-29	298-811		4 Al, 3 Mo, and 1 V; density 4.5118 g cm^{-3}; alpha-beta body.	
△	63-29	298-811		7 Al and 4 Mo; density 4.48 g cm^{-3}; alpha-beta body.	
▽	65-6	273-1089		RMI - 4 Al - 3 Mo - 1 V; Reactive Meatls, Inc.; 3.75 - 4.75 Al, 2.3 - 3.5 Mo, 0.5 - 1.5 V, 0.25 Fe, 0.08 C, 0.05 N, and 0.015 H density 0.163 lb in^{-3} and approx melting temperature 3000 F; alpha-beta alloy; beta transus 1755 ± 25 F.	Fully annealed at 1225 F for 4 hrs, furnace-cooled to 1050 F, and air-cooled; stress relief 1000-1100 F for 1 hr and air-cooled; blocking forging at 1750 - 1800 F and finishing at 1650 - 1700 F.
◇	65-6	273-1089		RMI 7 Al - 4 Mo; Reactive Metals, Inc.; 6.5 - 7.3 Al, 3.4 - 4.5 Mo, 0.25 Fe, 0.08 C, 0.05 N, and 0.0100 - 0.0125 H; density 0.162 lb in^{-3} and approx melting point 3000 F; alpha-beta body with beta transus 1840 ± 25 F.	Fully annealed at 1500 F for 1 hr, furnace-cooled to 1050 F, and air-cooled; stress relief at 1300 F for 1 hr and air-cooled; blocking forging at 1800 - 1850 F and finishing at 1650 - 1750 F.
●	63-29	293-811		8 Al, 1 Mo, and 1 V; density 4.3734 g cm^{-3}; alpha phase.	

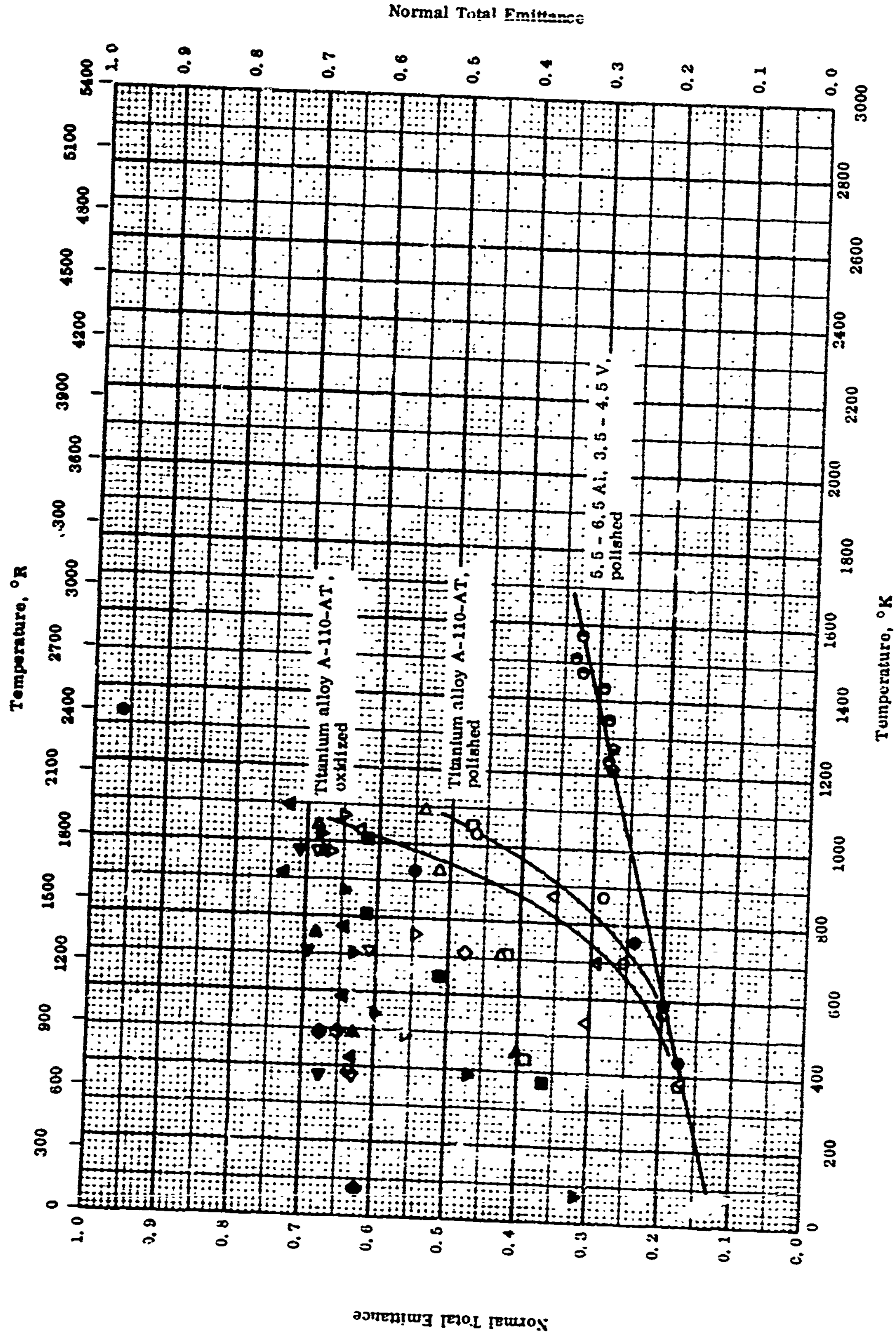


THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(2-8 Al and 1-6 V)

THERMAL LINEAR EXPANSION -- TITANIUM + ALUMINUM + ΣX_i
(2 - 8 Al and 1 - 6 V)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-31	293-1033		Crucible C-120 AV; 6 Al and 4 V; density 0.160 lb in.$^{-3}$ and melting range 2786 - 2976 F.	
□	62-28	311-922		Reactive metals (heat No. 32167 and sheet No. 1777A-1); 6.03 Al, 4.0 V, 0.15 Fe, 0.043 C, 0.009 N, 0.0800 O, and 0.0063 H; sample 0.1 in. in dia and 1.968 in. in length.	Machined from 0.125 in. thick sheet parallel to grain direction, solution treated at 1700 F for 20 min, oil-quenched, aged at 900 F for 4 hrs, and air-cooled; average data of three samples with permanent expansion from 0.011 - 0.025%.
▽	63-29	293-811		8 Al, 1 V, and 1 Mo; density 4.3734 g cm^{-3}; alpha phase.	
●	63-29	293-811		6 Al and 4 V; density 4.43 g cm^{-3}; alpha- beta alloy.	
◇	63-29	293-811		Same as above; low carbon content.	
■	63-29	2[illegible]-811		6 Al, 6 V, 2 Sn, and 1 Fe and Cu; density 4.54 g cm^{-3} and alpha-beta alloy.	
▲	65-6	273-[illegible]1		RMI - 3 Al - 2.5 V from Reactive Metals, Inc.; 2.5 - 3.5 Al, 2.0 - 3.0 V, 0.30 Fe, 0.12 O, 0.05 C, 0.02 N, and 0.0125 - 0.0150 H; density 0.162 lb in.$^{-3}$ and approximate melting 3100 F; alpha-beta alloy.	Fully annealed at 1300 F for 1 hr, air cooled, stress relief at 1300 F for 1 hr and air-cooled.
△	61-30	293-1700		Ti - 6 Al - 4 V; prepared from 140 Bhn sponge; sample 5/8 in. dia rod; melting point 2900 F.	Annealed; measured in vacuum of about 3 x 10^{-4} mm Hg; beta transus temperature 1825 F; heating.
▼	61-30	293-1700		Same as above.	Cooling data of the above sample.



NORMAL TOTAL EMITTANCE -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

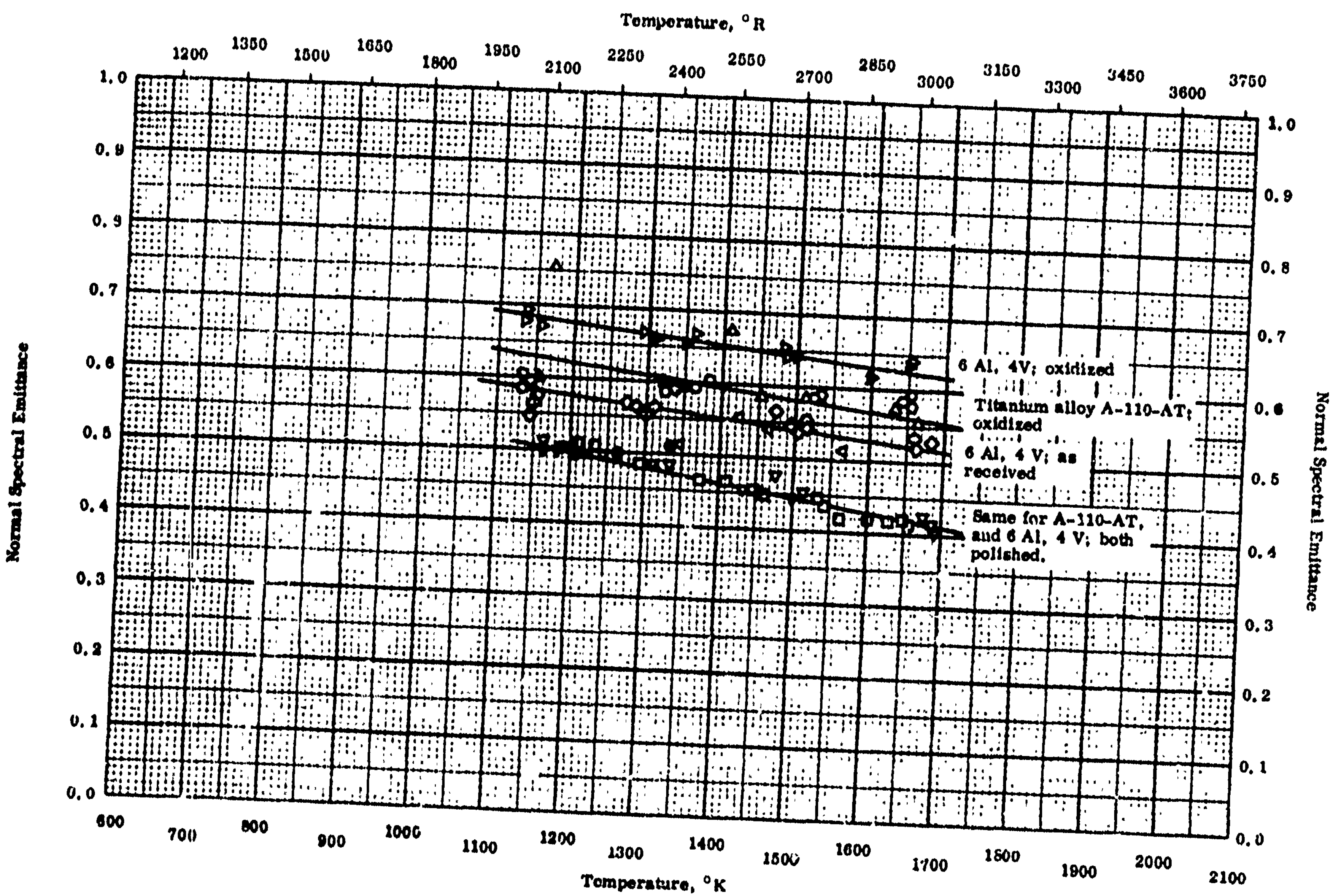
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-25	80-1033		Titanium alloy A-110-AT; nominal: 5 Al and 2.5 Sn.	Polished; measured in air; cycle 1.
□	58-25	436-1047		Same as above.	The above specimen; cycle 2 heating.
◇	58-25	708		Same as above.	The above specimen; cycle 2 cooling.
▷	58-25	446-1089		Same as above.	The above specimen; cycle 3.
△	58-25	383-1028		Titanium alloy A-110-AT.	Oxidized at 922 K for 30 min.; measured in air; cycle 1.
▽	58-25	483-1064		Same as above.	The above specimen; cycle 2.
▷	58-25	375-978		Same as above.	The above specimen; cycle 3 heating.
◆	58-25	78-486		Same as above.	The above specimen; cycle 3 cooling.
●	58-25	78-922		90 Ti, 6 Al, and 4V.	Polished; measured in air; cycle 1.
■	58-25	375-1011		Same as above.	The above specimen; cycle 2 heating.
◆	58-25	383		Same as above.	The above specimen; cycle 2 cooling.
▲	58-25	422-1086		Same as above.	The above specimen; cycle 3.
▼	58-25	75-1019		90 Ti, 6 Al, and 4 V.	Oxidized at 922 K for 30 min.; measured in air; cycle 1.
▶	58-25	486-1039		Same as above.	The above specimen; cycle 2.
◀	58-25	375-975		Same as above.	The above specimen; cycle 3 heating.
◆	58-25	489		Same as above.	The above specimen; cycle 3 cooling.

(continued onto next page)

NORMAL TOTAL EMITTANCE -- TITANIUM + ALUMINUM + ΣX_i (Continued)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
◐	63-21	1233-1566		5.5 - 6.5 Al, 3.5 - 4.5 V, 0.1 max. C, 0.3 max. Fe, 0.05 max. N_2, 0.0125 max. H_2, and 0.15 max. O_2; surface roughness: 2 - 3 μ RMS.	Polished; measured in a vacuum of 3 - 4 μ Hg; heating.
◐	63-21	1216-1333		Same as above.	The above specimen; cooling.

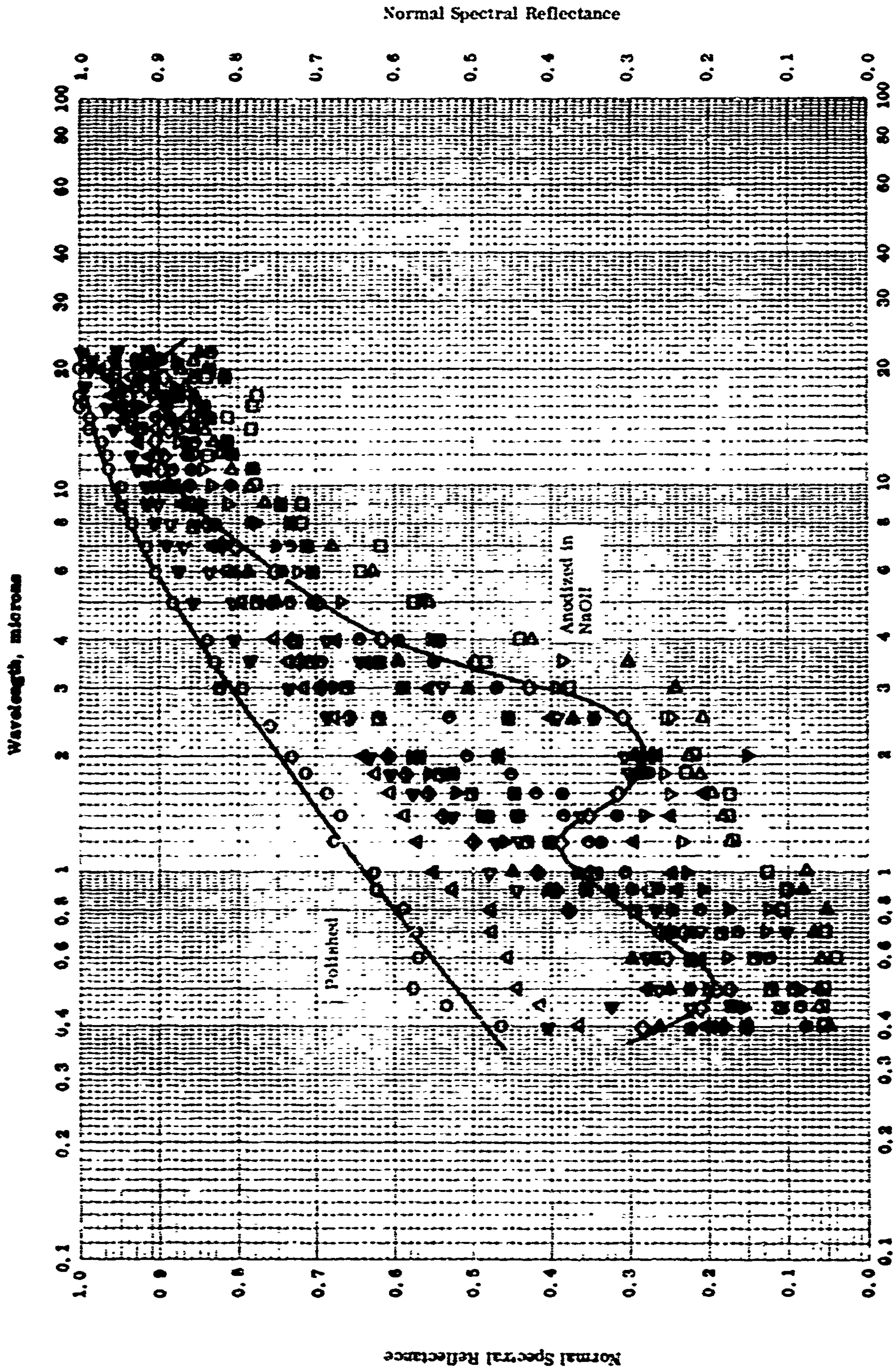


NORMAL SPECTRAL EMITTANCE --- TITANIUM + ALUMINUM + ΣX_i

NORMAL SPECTRAL EMITTANCE -- TITANIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	57-48	0.665	1133-1655		Titanium alloy A-110-AT: nominal: 5 Al, and 2.5 Sn.	Measured in vacuum; same data for as received and cleaned (with a liquid detergent).
□	57-48	0.665	1211-1658		Same as above.	Polished with fine polishing compounds; measured in vacuum.
△	57-48	0.665	1130-1666		Same as above.	Oxidized in air at red heat for 30 min.; measured in vacuum.
◇	57-48	0.665	1147-1680		90 Ti, 6 Al, and 4 V.	Measured in vacuum; same data for as received and cleaned (with a liquid detergent).
▽	57-48	0.665	1164-1691		Same as above.	Polished with fine polishing compounds; measured in vacuum.
▷	57-48	0.665	1133-1655		Same as above.	Oxidized in air at red heat for 30 min.; measured in vacuum.
◁	63-21	0.65	1230-1566		5.5 - 6.5 Al, 3.5 - 4.5 V, 0.1 max. C, 0.3 max. Fe, 0.05 max. N_2, 0.0125 max. H_2, and 0.15 max. O_2, surface roughness: 2 - 3 μ RMS.	Polished; measured in vacuum (3 - 4 μ Hg); heating.
●	63-21	0.65	1210-1333		Same as above.	The above specimen; cooling.



NORMAL SPECTRAL REFLECTANCE -- TITANIUM + ALUMINUM + ΣX_i
(Titanium alloy A-110-AT)

NORMAL SPECTRAL REFLECTANCE -- TITANIUM + ALUMINUM + ΣX_i
(Titanium alloy A-110-AT)

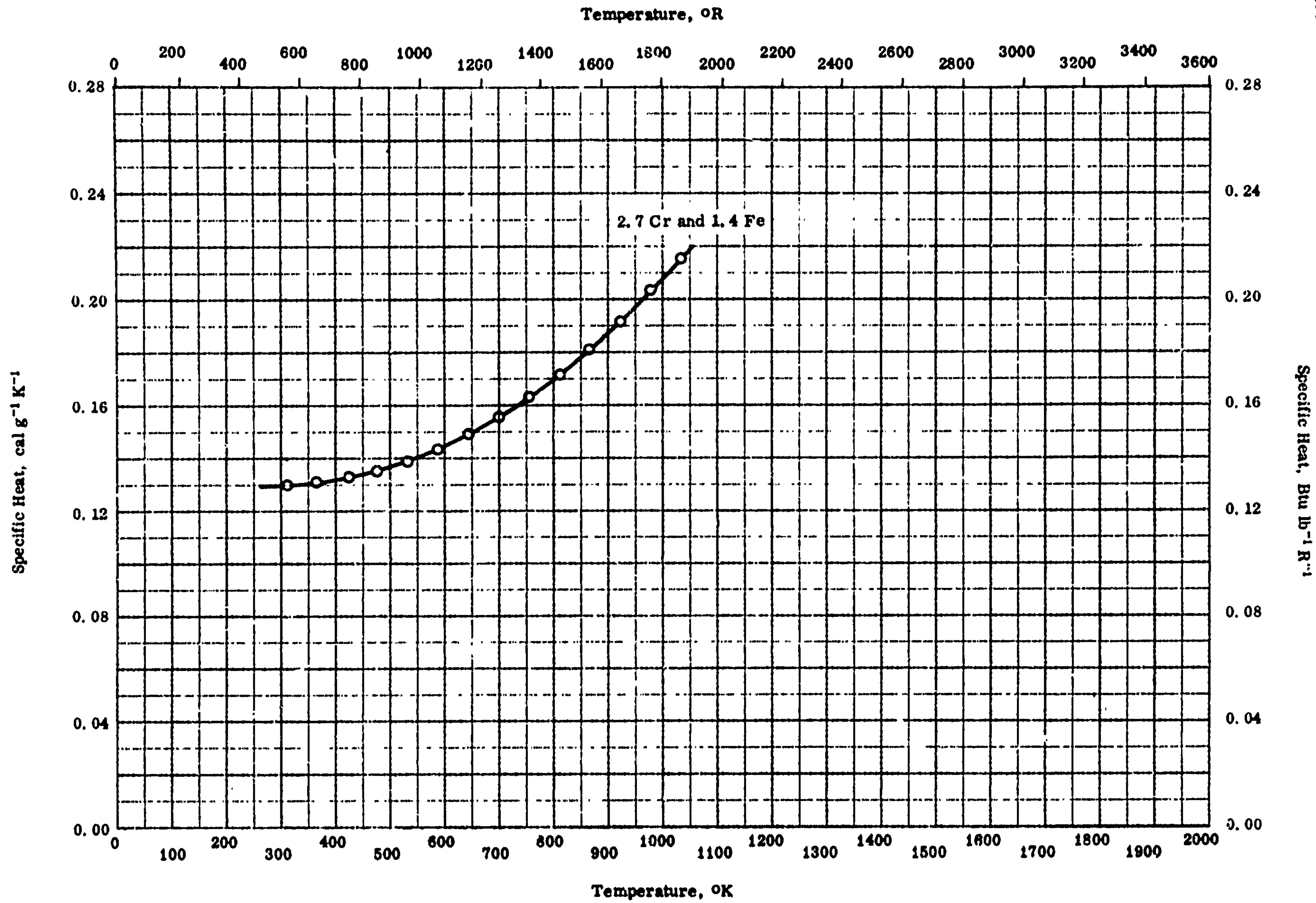
REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	61-22	298	0.4-22		Titanium alloy A-110-AT; nominal: 5 Al and 2.5 Sn.	Mechanically and electropolished; 10^{-5} mm Hg vacuum.
△	61-22	298	0.4-20		Titanium alloy A-110-AT.	Mechanically polished; 10^{-5} mm Hg vacuum.
◇	61-22	298	0.4-21.0		Titanium alloy A-110-AT.	Mechanically polished; pickled, anodized in NaOH, and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.
●	61-22	422	0.4-21.0		Same as above.	The above specimen measured at 422 K.
▽	61-22	589	0.4-21.0		Same as above.	The above specimen measured at 589 K.
□	61-22	755	0.4-19.0		Same as above.	The above specimen measured at 755 K.
▷	61-22	298	0.4-22.0		Same as above.	The above specimen after previous high temperature runs.
◁	61-22	298	0.4-22.0		Titanium alloy A-110-AT.	Mechanically and electropolished; oxidized in NaOH, and sealed; 10^{-5} mm Hg; 0.4×10^{-4} cm thick coating.
▲	61-22	533	0.4-22.0		Same as above.	The above specimen measured at 533 K.
●	61-22	811	0.4-22.0		Same as above.	The above specimen measured at 811 K.
◪	61-22	298	0.4-22.0		Same as above.	The above specimen after the previous run.
■	61-22	978	0.4-22.0		Same as above.	The above specimen measured at 978 K.
◆	61-22	298	0.4-22.0		Same as above.	The above specimen after the run at 978 K.
					(continued onto next page)	

NORMAL SPECTRAL REFLECTANCE -- TITANIUM + ALUMINUM + ΣX_i (Continued)
(Titanium alloy A-110-AT)

REFERENCE INFORMATION

Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
▶	61-22	298	0.4-22.0		Same as above.	Mechanically and electropolished; anodized in NaOH 1/3 standard time, and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.
◀	61-22	298	0.4-22.0		Titanium alloy A-110-AT; nominal: 5 Al and 2.5 Sn.	Mechanically and electropolished, anodized in sulfuric acid, and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.
▼	61-22	298	0.4-22.0		Titanium alloy A-110-AT.	Mechanically polished, pickled, anodized in sulfuric acid, and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.

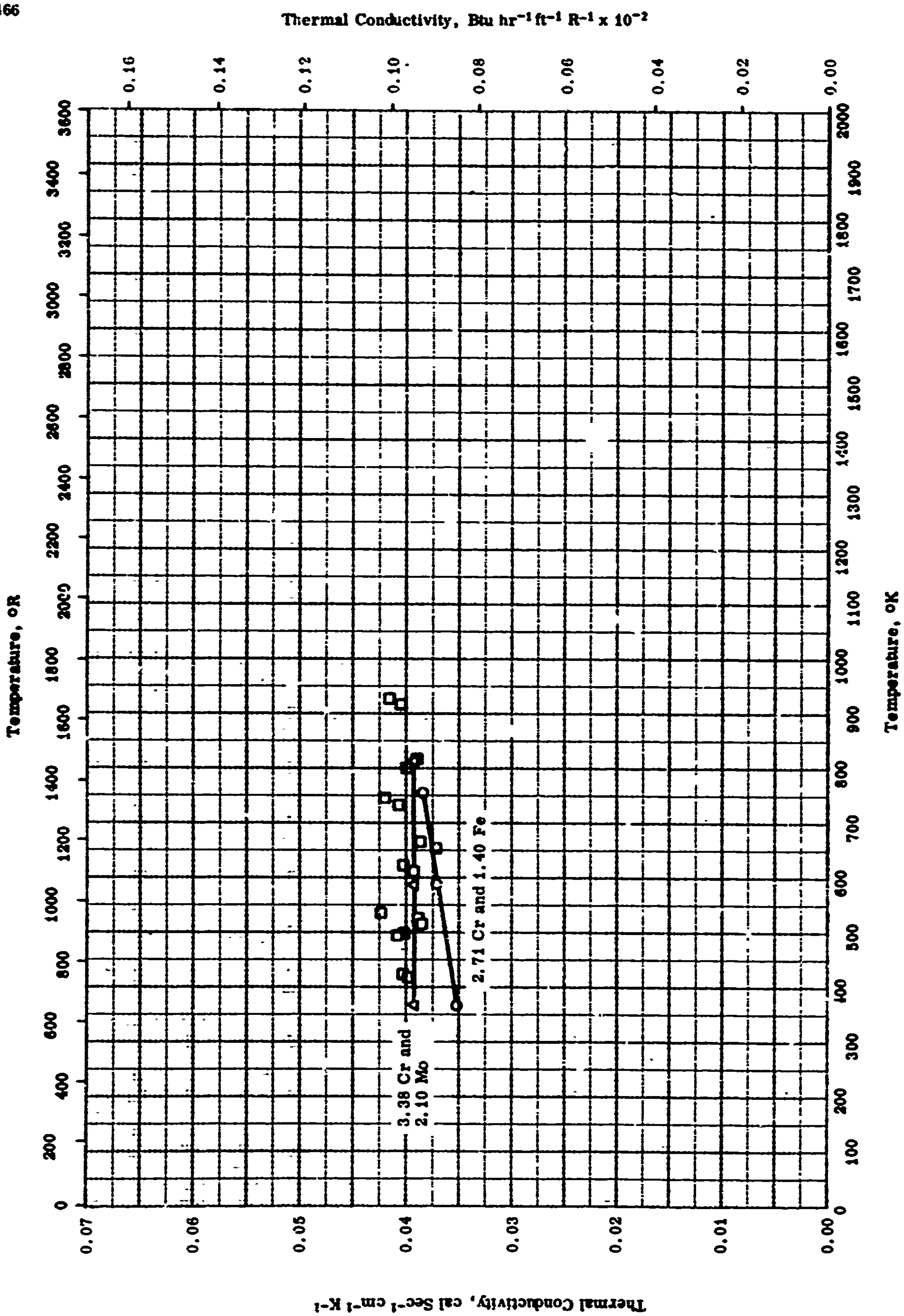


SPECIFIC HEAT -- TITANIUM + CHROMIUM + ΣX_i

SPECIFIC HEAT -- TITANIUM + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	56-9	311-1033		95.65 Ti, 2.71 Cr, 1.40 Fe, 0.105 O_2, 0.076 N_2, 0.05 C, and 0.0092 H_2.	

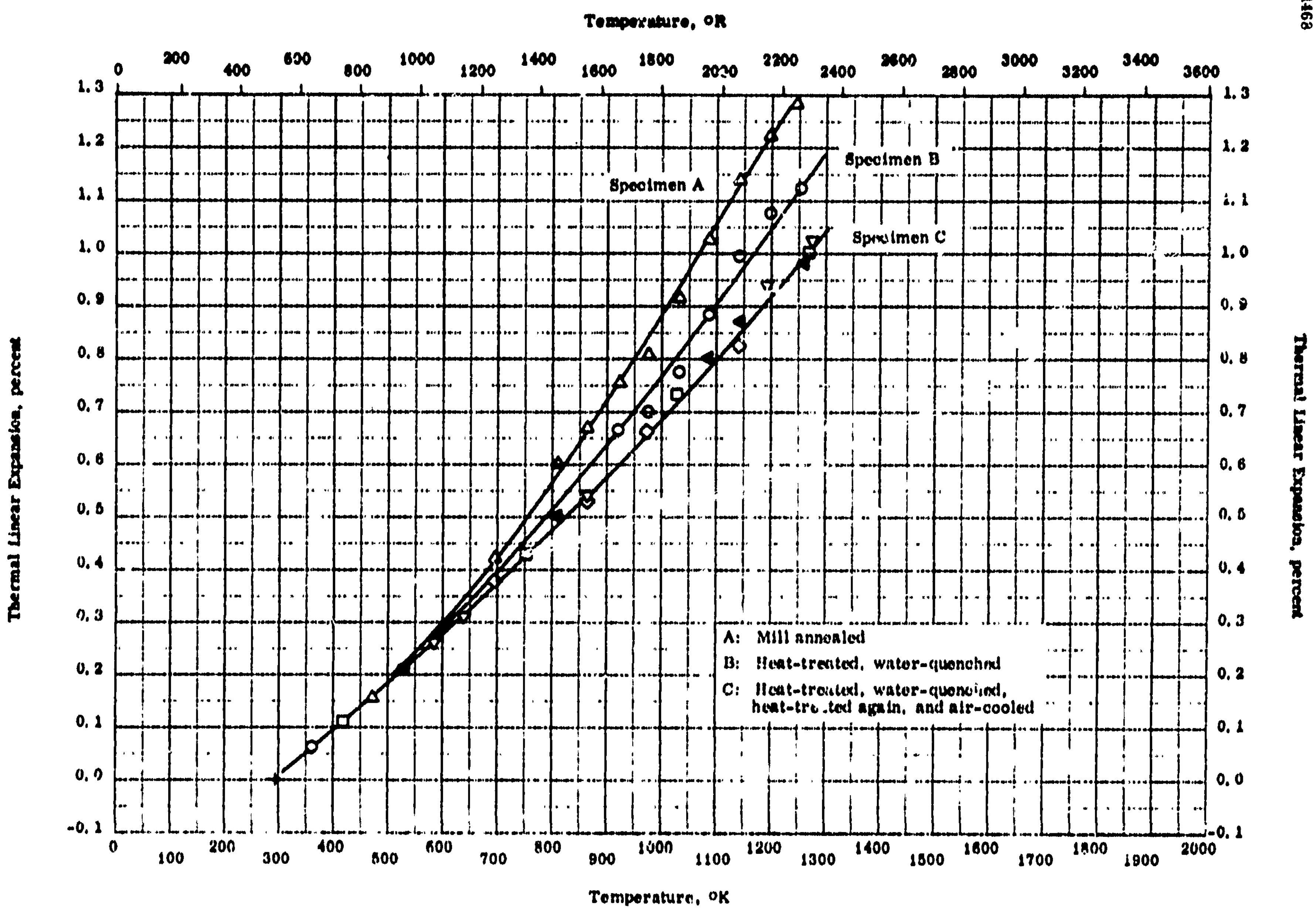


THERMAL CONDUCTIVITY -- TITANIUM + CHROMIUM + ΣX_i

THERMAL CONDUCTIVITY -- TITANIUM + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-9	367-756	10	Ti 150 A(2): 95.65 Ti, 2.71 Cr, 1.40 Fe, 0.105 O_2 0.076 N_2, 0.05 C, and 0.0092 H_2.	
△	56-9	367- 11	10	Cr - Mo: 96.30 Ti, 3.38 Cr, 2.10 Mo, 0.131 O_2, 0.[illegible]13 Fe, 0.032 N_2, 0.02 C, and 0.0077 H_2.	
□	56-9	418-927	10	Ti 150 (A); composition not given.	



THERMAL LINEAR EXPANSION -- TITANIUM + CHROMIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-32	298-1255		Obtained from Mallory - Sharon Titanium Corp.; 4.04 Cr, 3.47 Al, 0.25 Fe, 0.05 C, 0.036 N, and 0.0244 H; dimension 0.25 in. dia by 1.75 in. long. [Author's design.: Specimen A].	Mill annealed; measured under the pressure of approx 0.8 micron with a heating rate of 1 F min^{-1}; first run.
□	58-32	298-1272		Same as above.	Second run of above specimen; vacuum-cooled.
△	58-32	298-1243		Same as above. [Author's design.: Specimen B].	Heat treated at 1700 F for 10 min. and then water quenched; measured under the pressure of approx 0.8 micron with a heating rate of 1 F min^{-1}; first run.
▽	58-32	298-1278		Same as above.	Second run of above specimen; vacuum-cooled.
◇	58-32	298-1264		Same as above. [Author's design.: Specimen C].	Heat-treated at 1700 F for 10 min. water-quenched, and heat-treated again at 1000 F for 20 hrs. and then air-cooled; tested under the same condition as above; first run.
◁	58-32	298-1264		Same as above.	Second run of above specimen; vacuum-cooled.

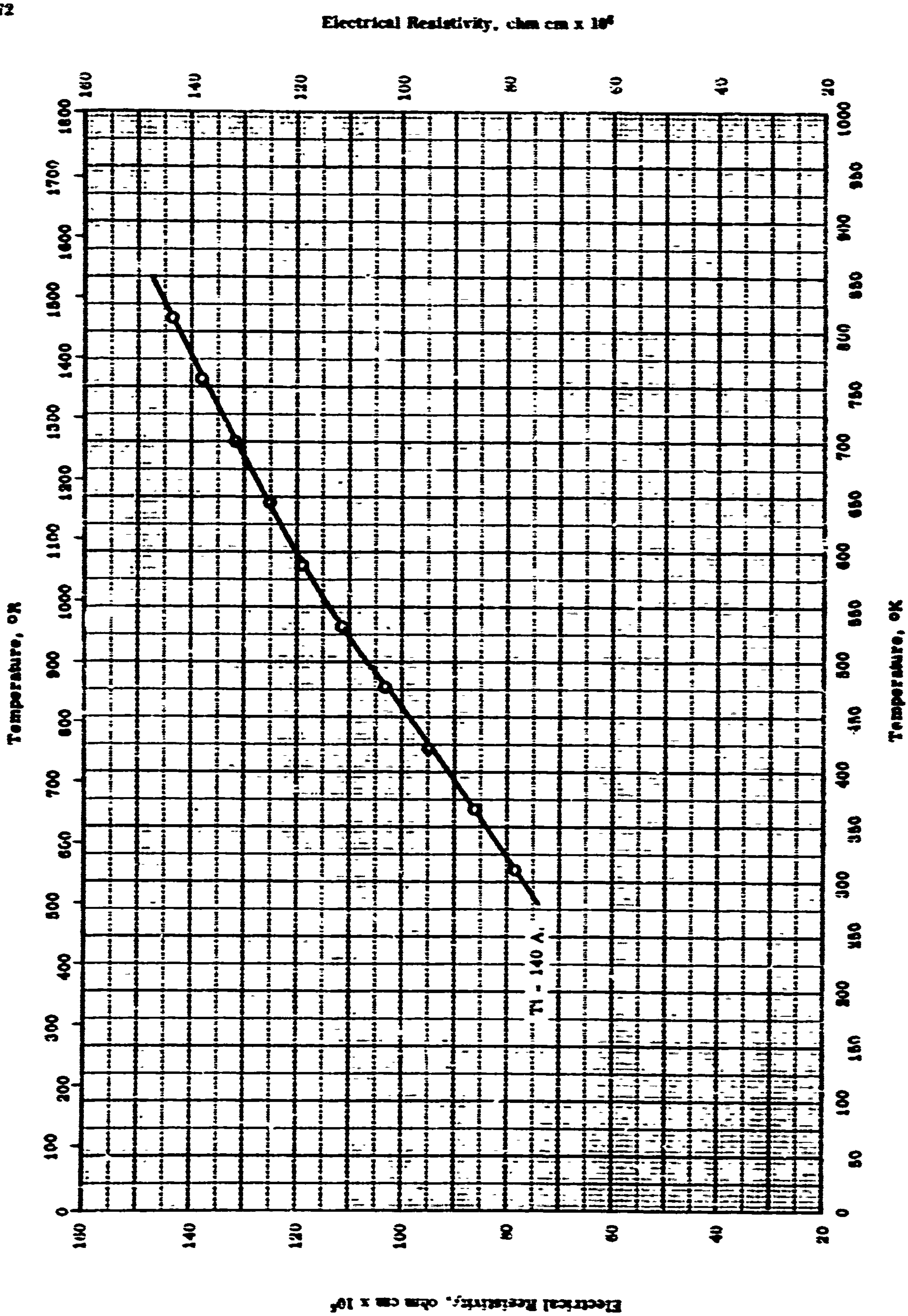
PROPERTIES OF TITANIUM + IRON + ΣX_i

REPORTED VALUES

Density:	$g\ cm^{-3}$	$lb\ ft^{-3}$
O 1.11 Fe and 1.05 Si	4.544	283.7

REFERENCE INFORMATION

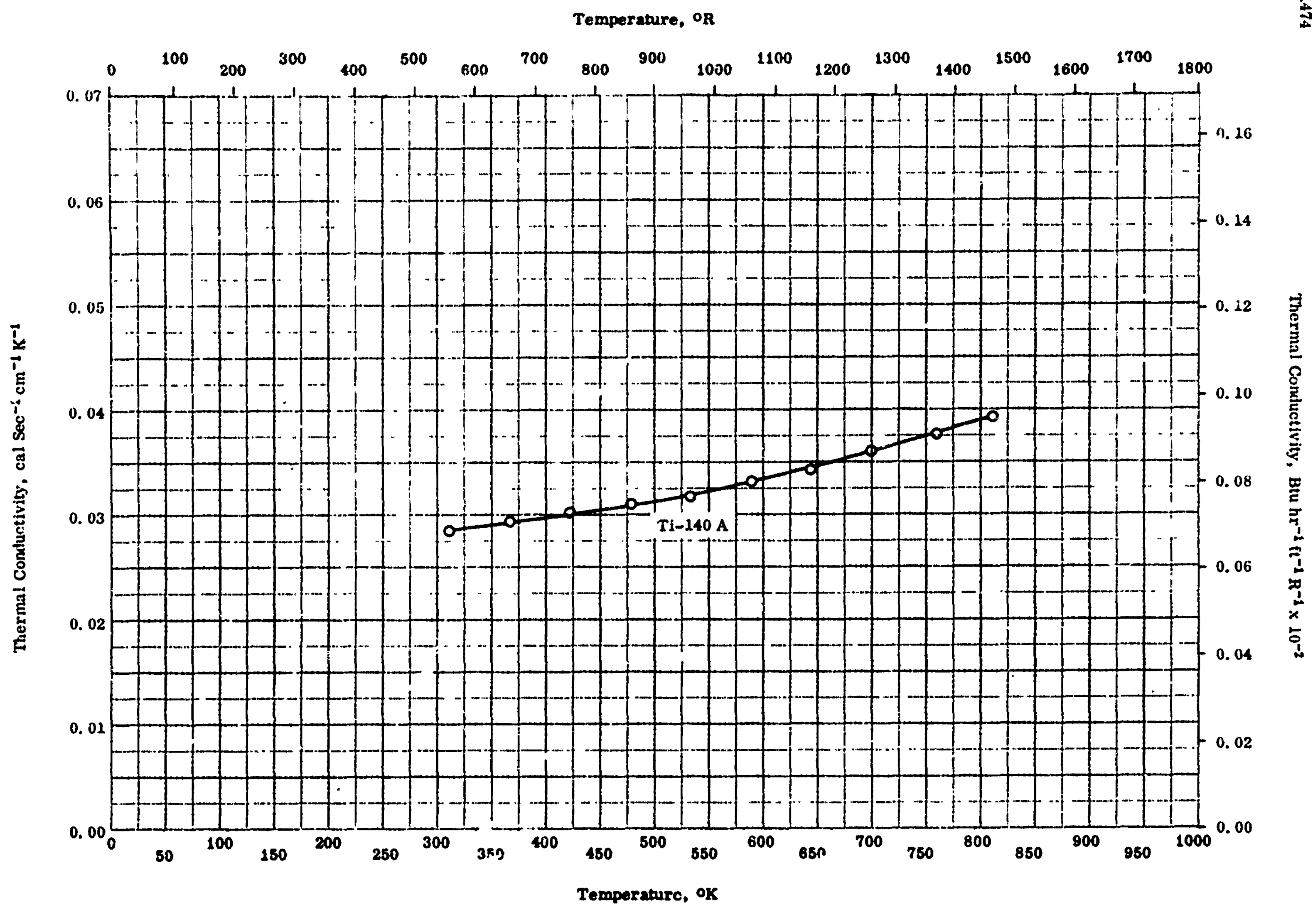
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	43-2	298		1.11 Fe, 1.05 Si, 0.22 C, 0.2 > Cu, 0.2 > Nb, 0.17 V, and 0.01 Mn.	



ELECTRICAL RESISTIVITY -- TITANIUM + IRON + ΣX_i

REFERENCE INFORMATION

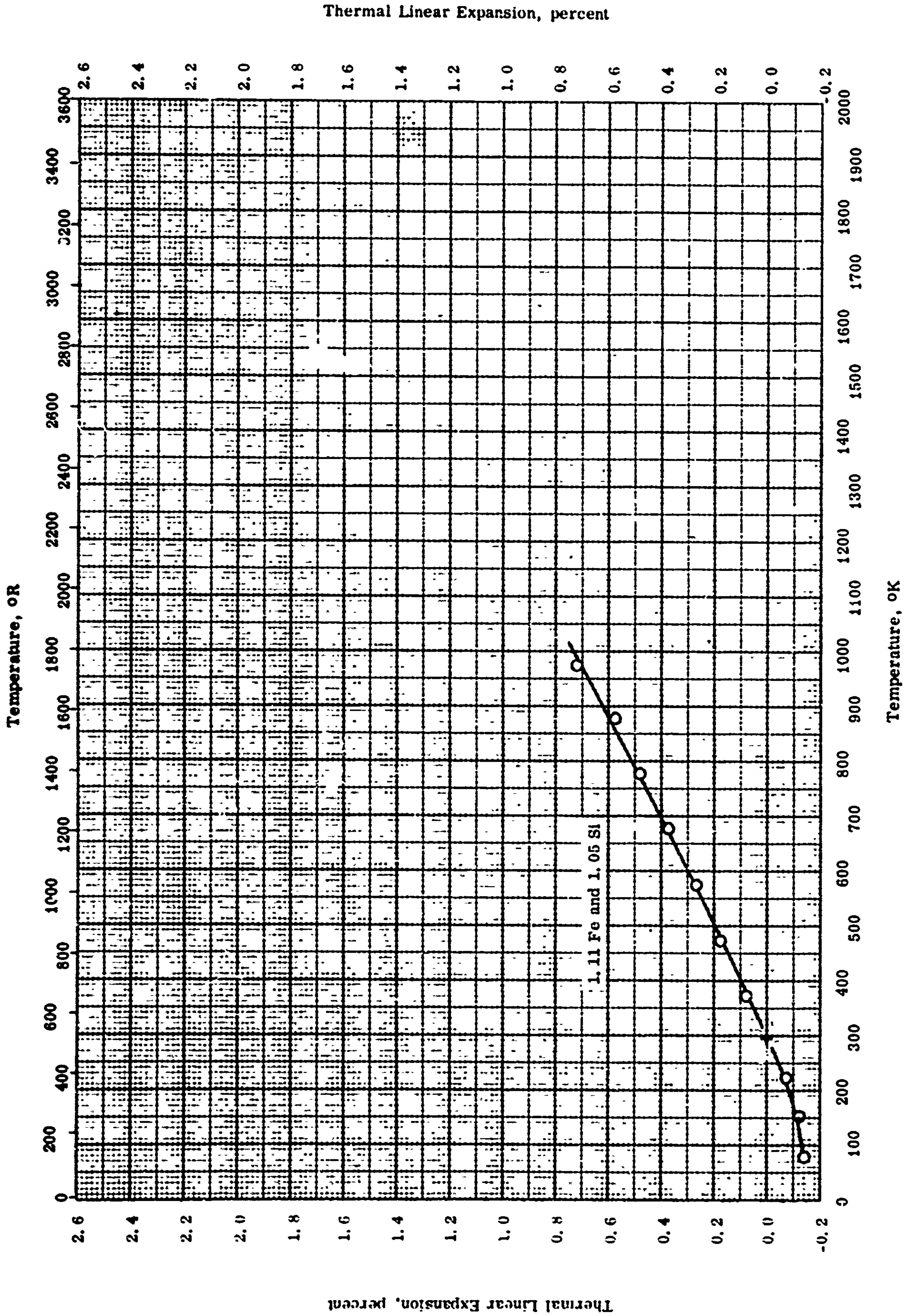
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	58-14	311-811	[illegible]	Ti - 140 A; nominal: 2.2 Fe, 2.1 Cr, and 2.0 Mo.	



THERMAL CONDUCTIVITY -- TITANIUM + IRON + ΣX_i

REFERENCE INFORMATION

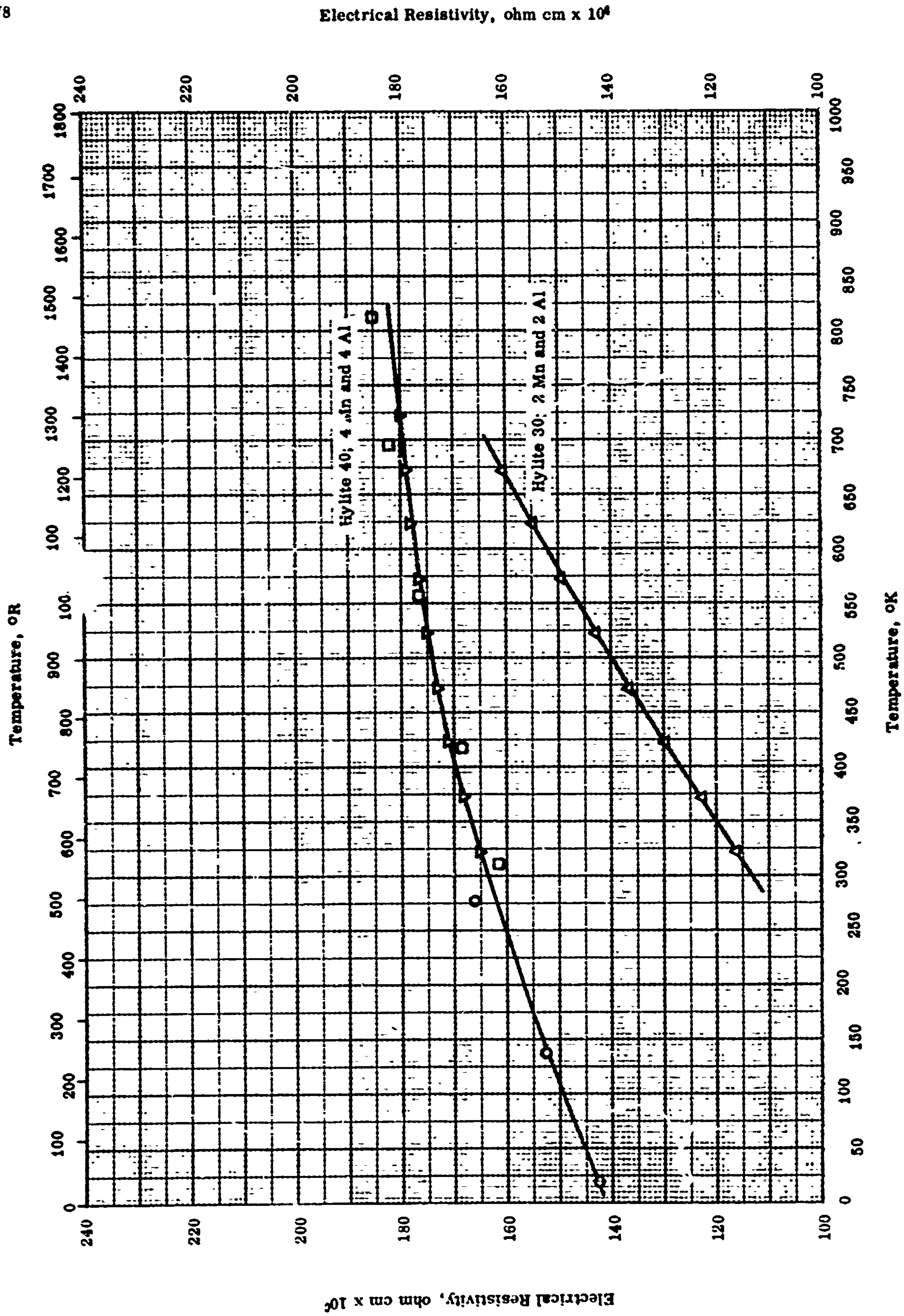
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	58-14	311-811	± 5	Ti - 140 A; 2.2 Fe, 2.1 Cr, and 2.0 Mo; average composition.	In a mild annealed condition.



THERMAL LINEAR EXPANSION -- TITANIUM + IRON + ΣX_i

REFERENCE INFORMATION

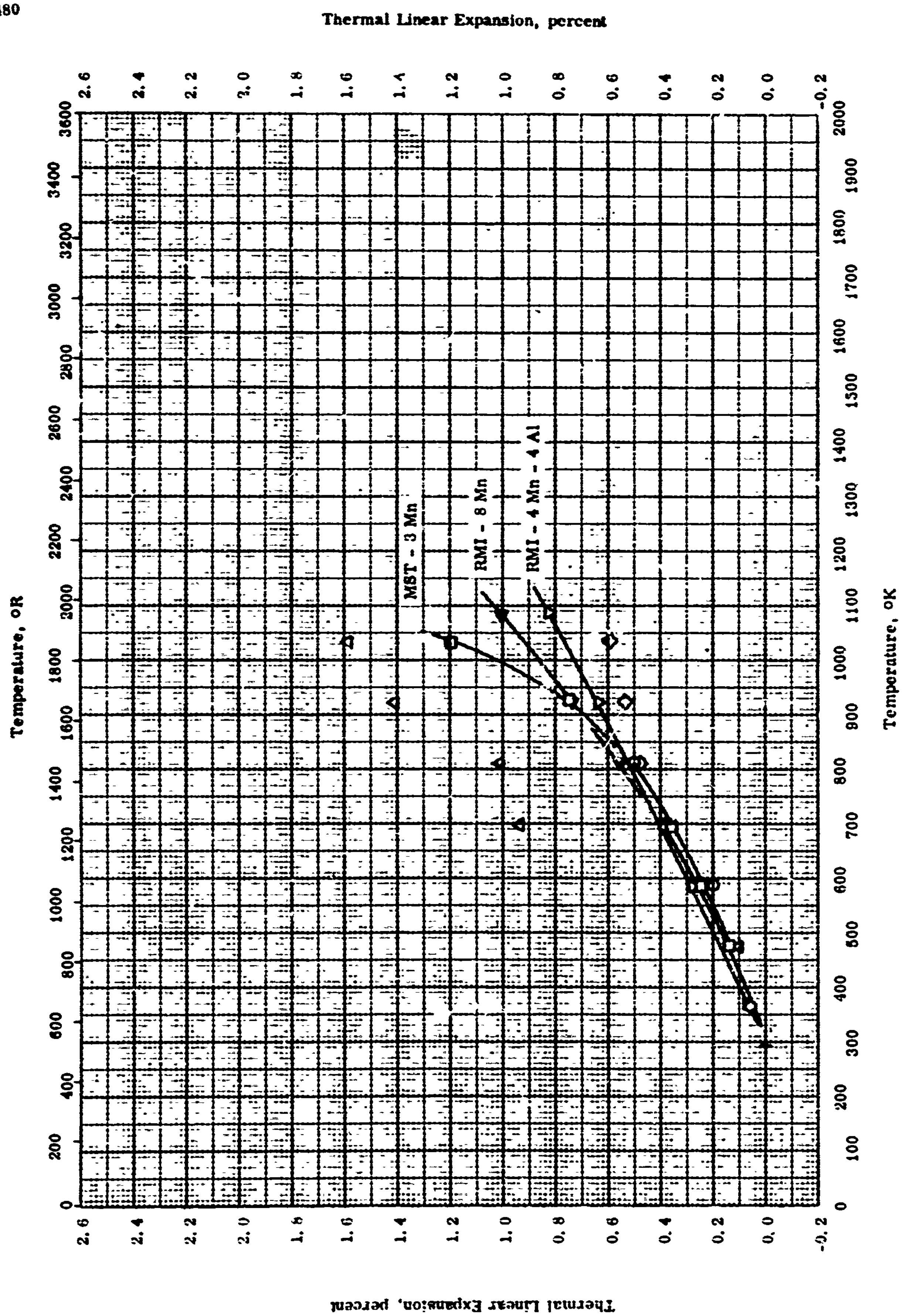
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	43-2	83-973		1.11 Fe, 1.05 Si, 0.22 C, 0.17 V, and 0.2 > Nb, Cu each; density 283.5 lb ft^{-3}.	



ELECTRICAL RESISTIVITY -- TITANIUM + MANGANESE + ΣX_i

REFERENCE INFORMATION

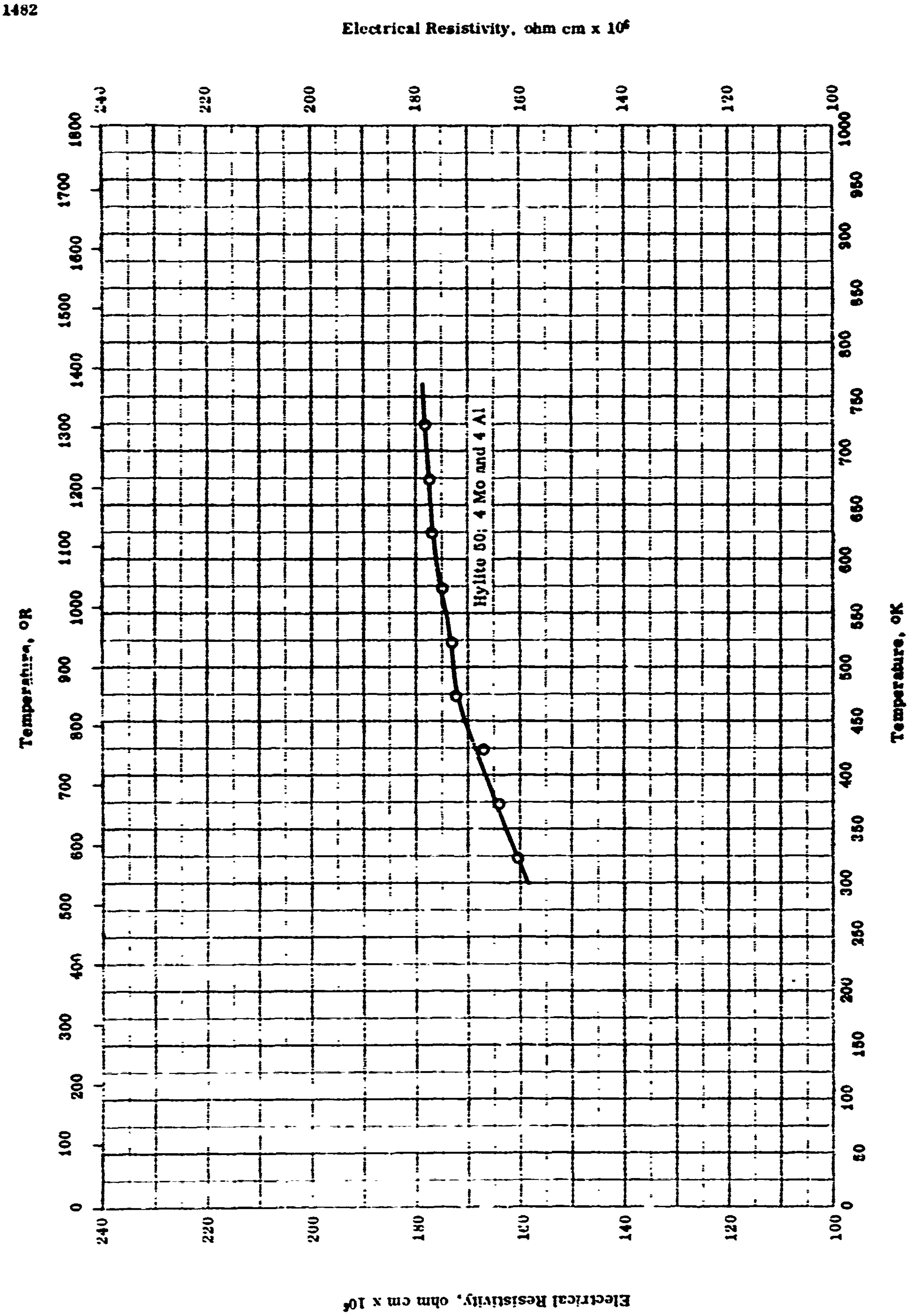
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-9 also 53-10	20-300	±2	Ti alloy RC-130 B; 4.7 Mn, 3.99 Al, and 0.14 C.	
□	58-14	311-811	±1	Ti alloy C-130 AM (formerly RC-130 B); nominal: 4 Mn and 4 Al.	
△	61-10	323-673		Hylite 20; 2 Mn, 2 Al, and 0.015> H_2.	
▽	61-10	323-723		Hylite 40; 4 Mn, 4 Al, and 0.015> H_2.	



THERMAL LINEAR EXPANSION -- TITANIUM + MANGANESE + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-29	293-811		4 Mn and 4 Al; density 4.51 g cm^{-3}; alpha-beta alloy.	
□	61-29	293-1033		MST - 3 Mn; 3 Mn, and 1 Cr, Fe, Mo, V each.	Annealed.
△	61-29	293-1033		Same as above.	Heated to 1600 F, held for 10 min, and water-quenched.
◇	61-29	293-1033		Same as above.	Heated to 1600 F, held for 10 min, water-quenched, and aged at 1000 F for 26 hrs.
▽	65-6	273-1089		RMI - 4 Al - 4 Mn; Reactive Metals, Inc.; 3.5 - 4.5 Mn, 3.5 - 4.5 Al, 0.40 Fe, 0.20 O, 0.08 C, 0.04 N, and 0.010 - 0.0125 H; density 0.163 lb in^{-3} and M.P. ~ 3000 F; alpha-beta alloy; beta transus 1750 ± 25 F.	Annealing temperature: full 1300 F for 2 - 4 hrs and furnace-cooled; stress relief at 1300 F for 2 hrs and furnace-cooled; forging temperature, blocking, 1650 - 1750 F; finishing, 1500 - 1600 F.
◀	65-6	273-1089		RMI - 8 Mn; Reactive Metals, Inc.; 7.0 - 9.0 Mn, 0.20 C, 0.07 N, and 0.015 H; density 0.171 lb in^{-3} and M.P. ~2850 F; alpha-beta alloy; beta transus 1475 ± 25 F.	Annealing temperature: full, 1300 F for 1 hr, furnace-cooled to 1000 F, and air-cooled; stress relief, 900 - 1100 for 1/2 - 2 hrs and air-cooled.

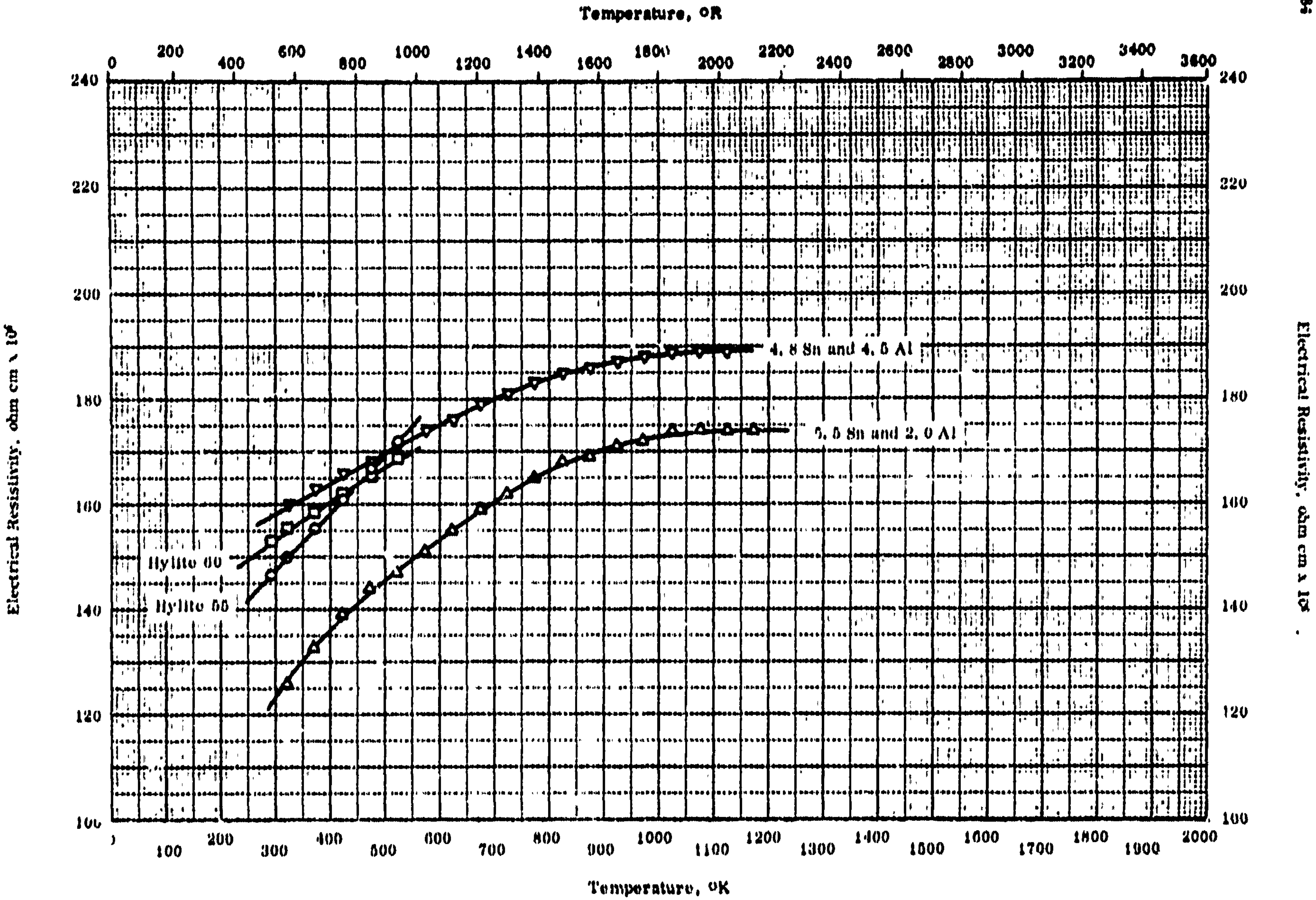


ELECTRICAL RESISTIVITY -- TITANIUM + MOLYBDENUM + ΣX_i

ELECTRICAL RESISTIVITY -- TITANIUM + MOLYBDENUM + ΣX_i

REFERENCE INFORMATION

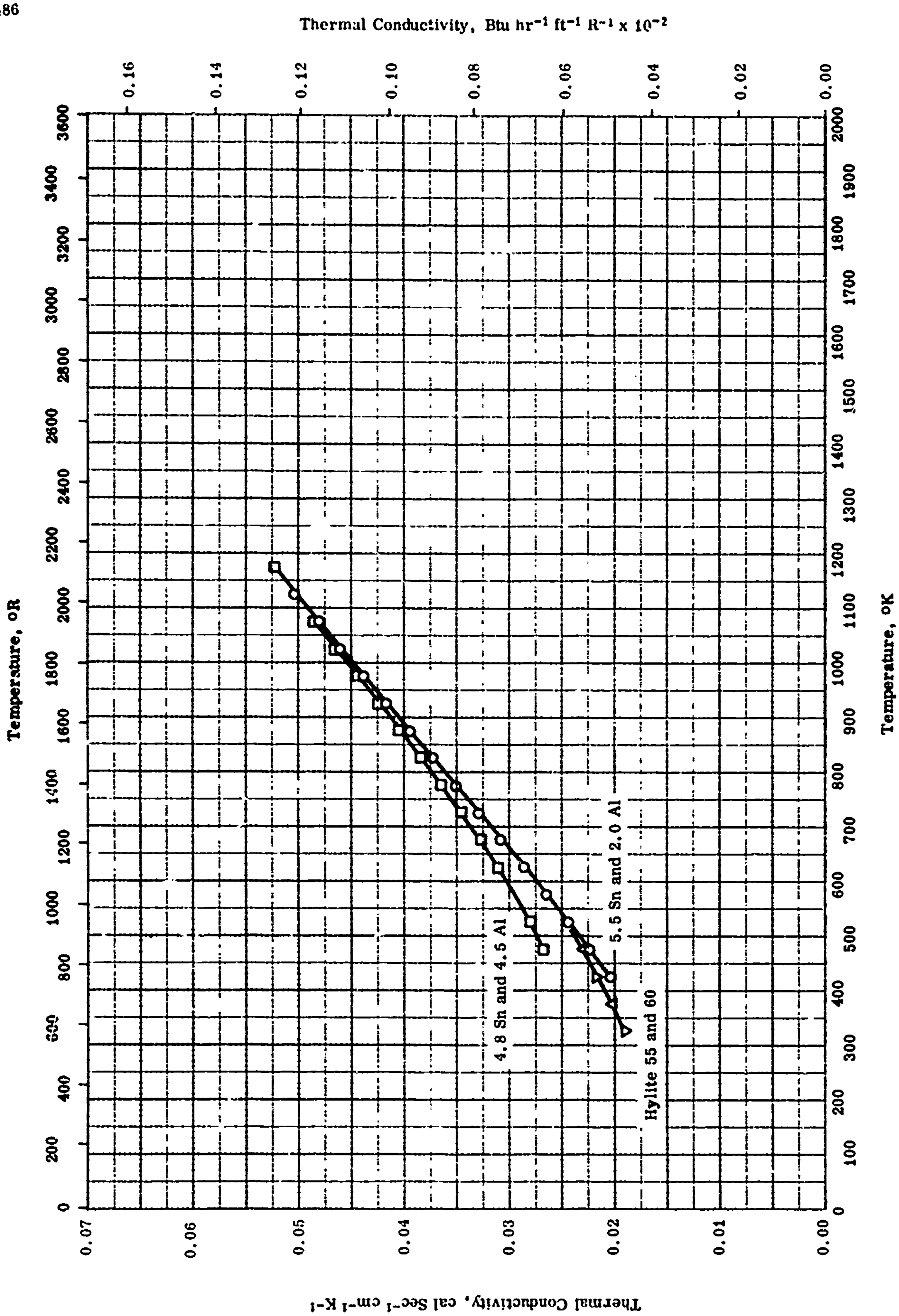
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	61-10	323-723		Hylite 50; 4 Mo, 4 Al, 2 Sn, 0.5 Si, and 0.015 > H_2.	



ELECTRICAL RESISTIVITY -- TITANIUM + TIN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-9	293-523		Hylite 55; 6 Sn, 5 Zr, 3 Al, 0.5 Si, and 0.013 > H_2.	
□	63-9	293-523		Hylite 60; 6 Sn, 5 Zr, 3 Al, 2 Mo, 0.5 Si, and 0.013 > H_2.	
△	61-11	323-1173		5.5 Sn and 2.0 Al.	
▽	61-11	323-1123		4.8 Sn and 4.5 Al.	



THERMAL CONDUCTIVITY -- TITANIUM + TIN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-11	423-1123		4.8 Sn and 4.5 Al.	
□	61-11	473-1173		5.5 Sn and 2.0 Al.	
△	63-9	323-523		Hylite 55 from Jessop-Saville LTD.; 6 Sn, 5 Zr, 3 Al, 0.5 Si, and 0.013 H_2.	
▽	63-9	323-523		Hylite 60 from Jessop-Saville LTD.; 6 Sn, 3 Al, 2 Mo, 0.5 Si, and 0.013 H_2.	

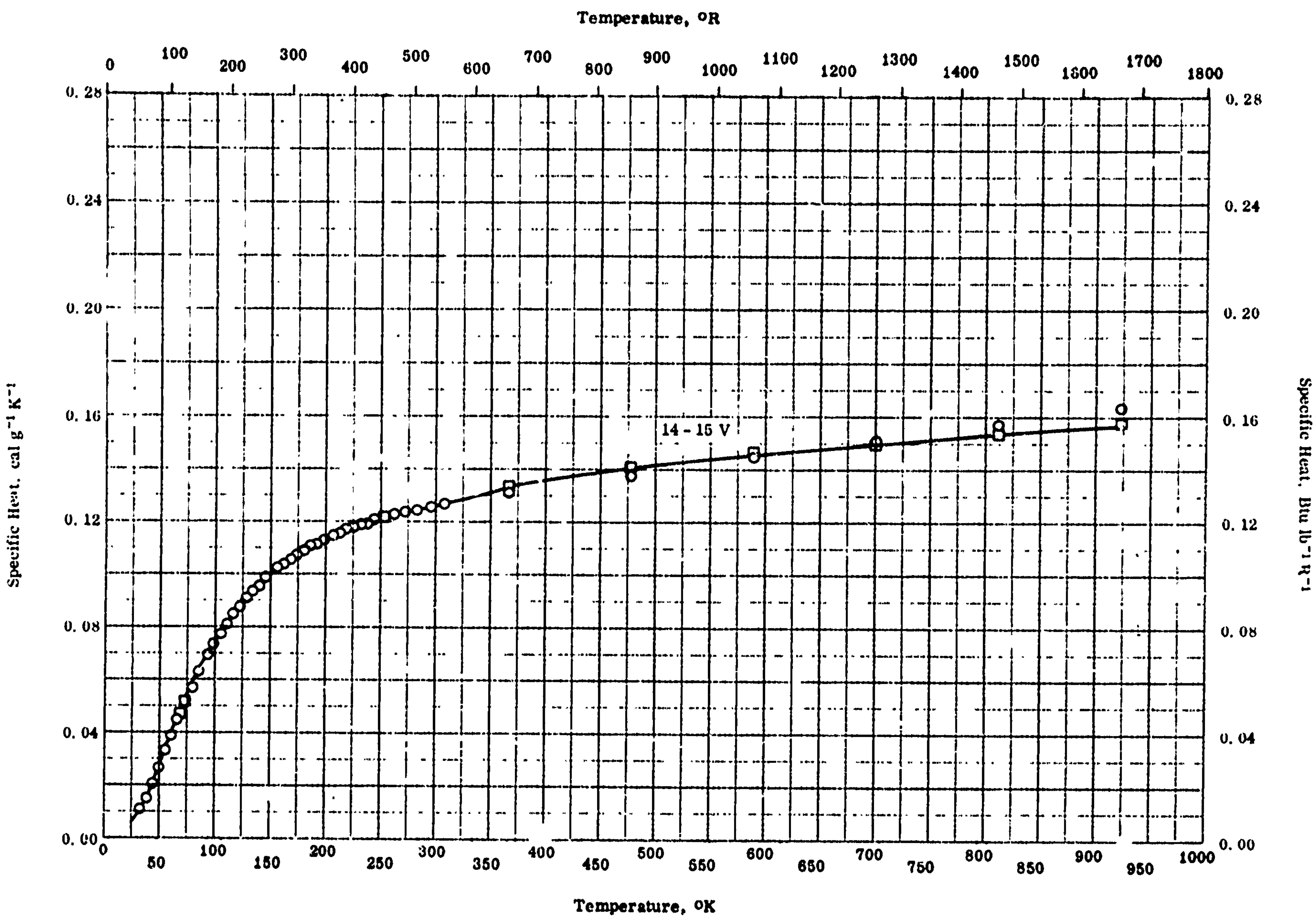
PROPERTIES OF TITANIUM + VANADIUM + ΣX_i

REPORTED VALUES

Density	$g\ cm^{-3}$	$lb\ ft^{-3}$
o 37.4 V and 5.4 Al	4.94	308

REFERENCE INFORMATION

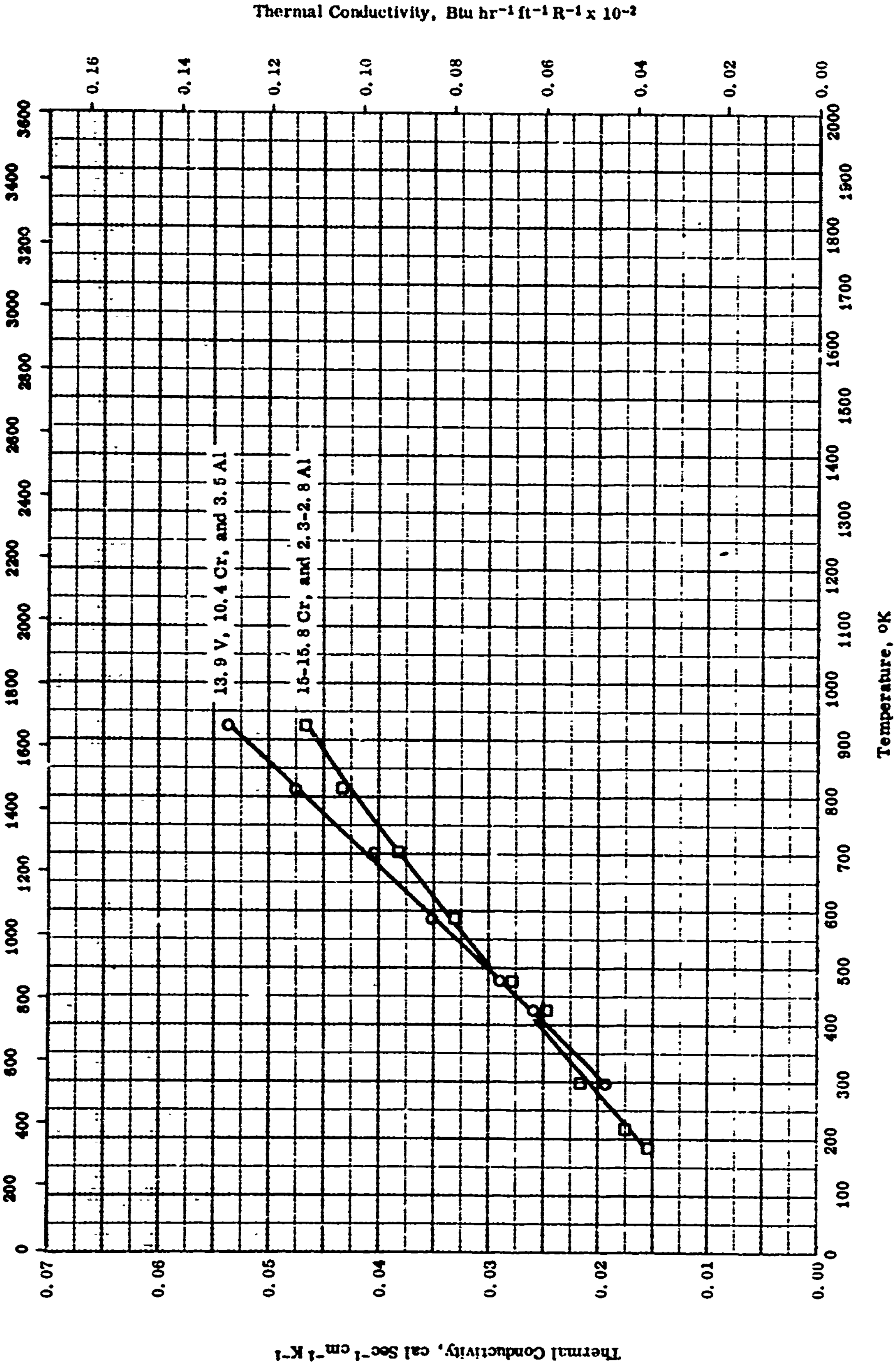
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	57-35	298		56.8 Ti, 37.4 V, 5.4 Al, and 0.67 C.	Rolled; probably not rolled to max density; density by weight in air and in water.



SPECIFIC HEAT -- TITANIUM + VANADIUM + ΣX_i

REFERENCE INFORMATION

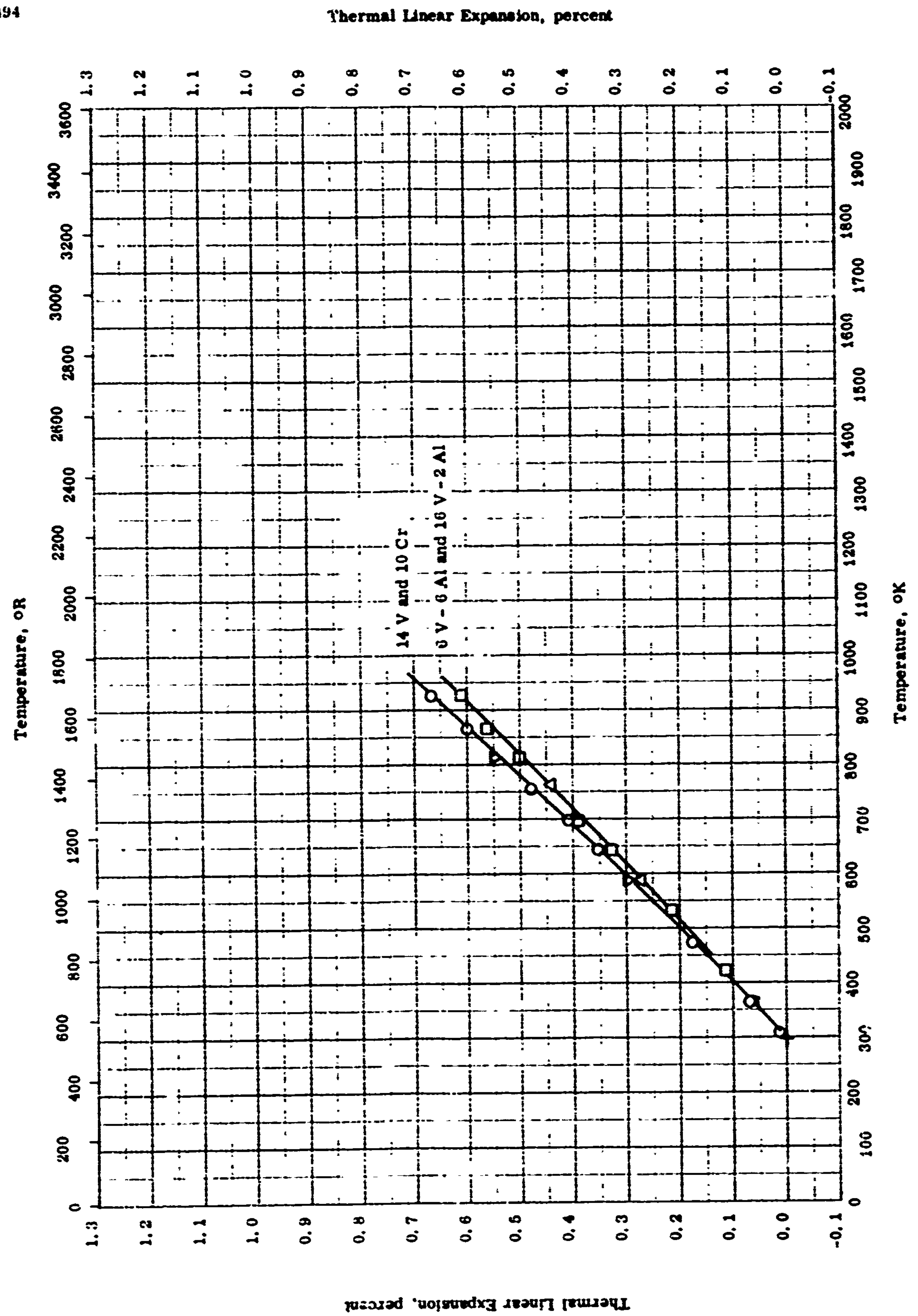
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-17	21-922	< 2.0	13 V-11 Cr-3 Al titanium alloy; 13.9 V, 10.4 Cr, 3.5 Al, 0.25 Fe, 0.04 C, 0.025 N_2, and 0.0114 H_2.	Solution treated at 1450 F for 20 min., air cooled, aged at 900 F for 60 hrs and then air cooled.
□	61-17	21-922	< 4.0	2.5 Al-16 V titanium alloy; 14.95 V, 2.75 Al, 0.21 Fe, 0.03 C, 0.015 N_2, and 0.0066 H_2.	Solution heat treated at 1410 F for 30 min. and then aged at 990 F for 4 hrs.



THERMAL CONDUCTIVITY -- TITANIUM + VANADIUM + ΣX_i

REFERENCE INFORMATION

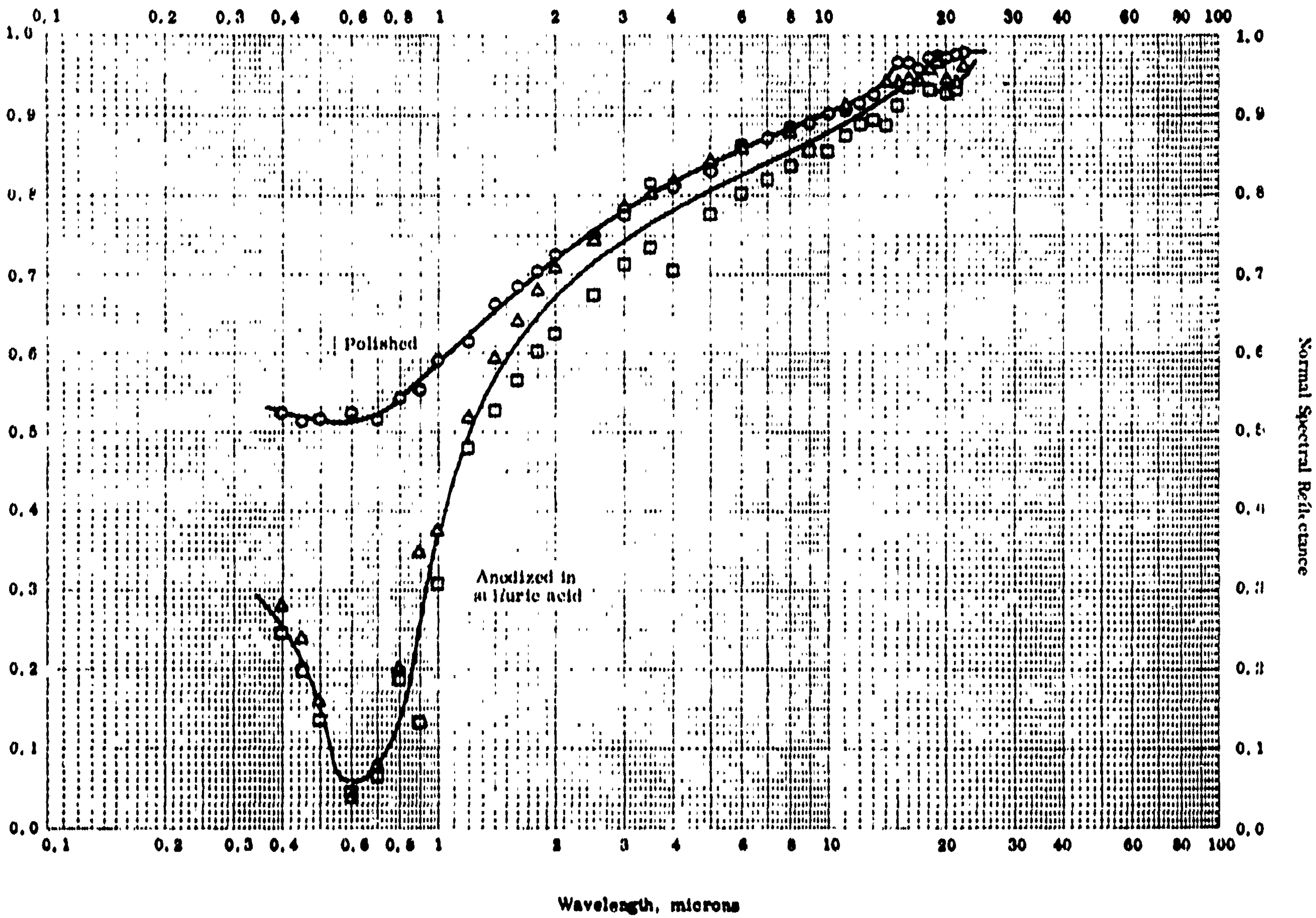
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-11	297-922		B120VCA Crucible heat no. R6759 Sheet no. 9MB3; 13.9 V, 10.4 Cr, 3.5 Al, 0.25 Fe, 0.04 C, 0.025 N_2, and 0.0114 H_2.	
□	62-11	183-922		Reactive Metals heat no. 23345 Sheet no. 114b-3; 15-15.8 V, 2.3-2.8 Al, 0.21 Fe, 0.17 N_2, 0.03-0.04 C and 0.0066 H_2.	



THERMAL LINEAR EXPANSION -- TITANIUM + VANADIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	62-28	311-922	<3	B 120 VCA (Crucible heat No. R6759, sheet No. 9MB3); 13.9 V, 10.4 Cr, 3.5 Al, 0.25 Fe, 0.04 C, 0.026 N, and 0.0114 H; dimension 0.1 in. dia by 1.968 in. long.	Cylindrical specimen machined from 0.125 in. thick sheet parallel to grain direction; solution treated at 1450 F for 20 min, air-cooled, aged at 900 F for 60 hrs, and air-cooled; average value of 2 runs.
□	62-28	311-922	<3	Reactive Metals (heat No. 23345, sheet No. 1149-3); 15.84 V, 2.31 Al, 0.21 Fe, 0.041 C, 0.018 N, 0.0650 O, and 0.0067 H; dimension 0.1 in. dia by 1.968 in. long.	Cylindrical specimen machined from 0.125 in. thick sheet, parallel to grain direction; solution treated at 1410 F for 30 min, water-quenched, aged at 990 F for 4 hrs, and air-cooled; average value of 3 runs.
△	63-29	293-811		6 V, 6 Al, and 1 Fe and Cu; density 4.54 g cm^{-3}; alpha-beta alloy.	
▽	63-29	293-811		13 V, 11 Cr, and 3 Al; density 4.84 g cm^{-3}; beta alloy.	

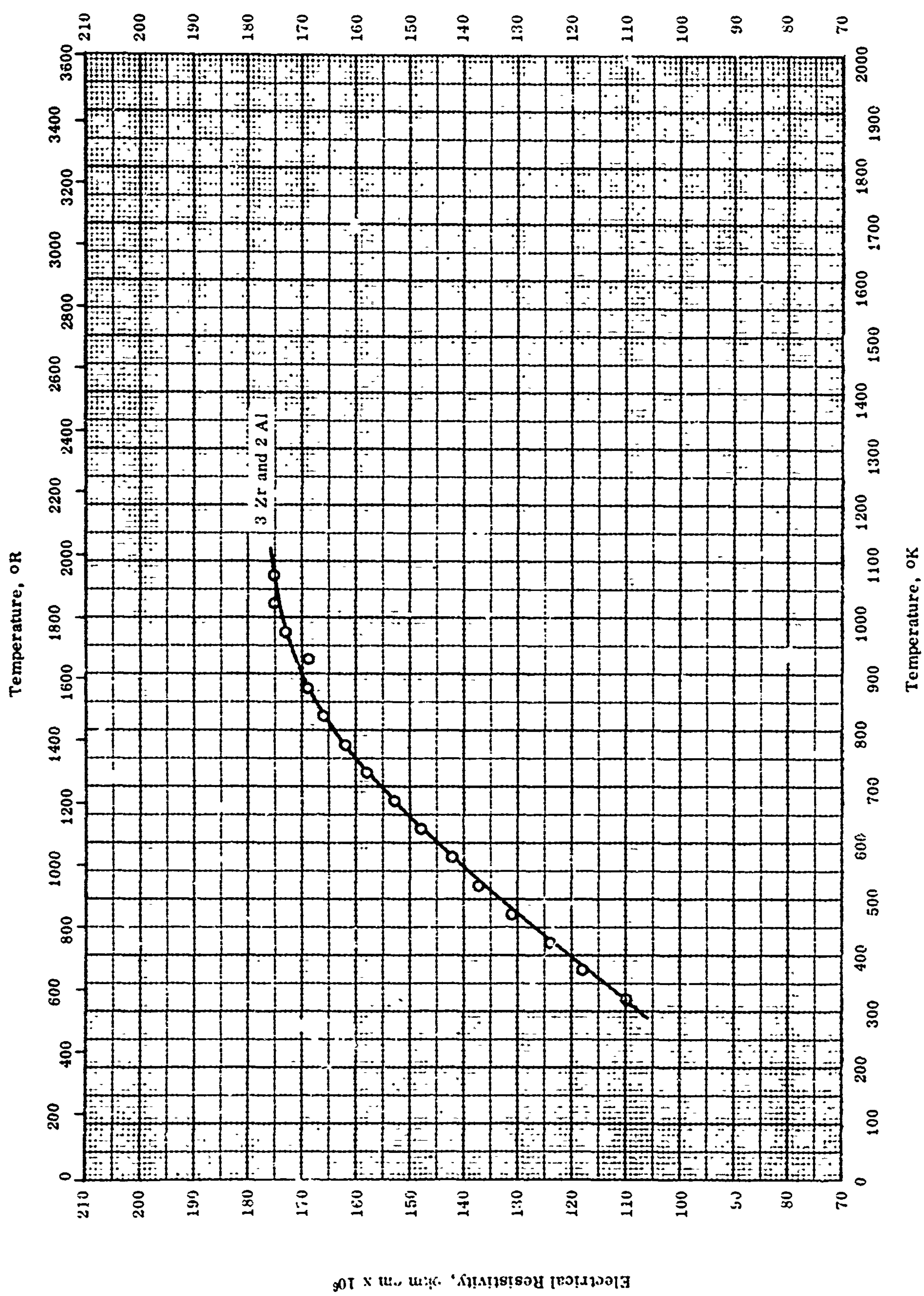


NORMAL SPECTRAL REFLECTANCE -- TITANIUM + VANADIUM + ΣX_i
(Ti B120 VAC)

NORMAL SPECTRAL REFLECTANCE -- TITANIUM + VANADIUM + ΣX_i
(Ti B120 VAC)

REFERENCE INFORMATION

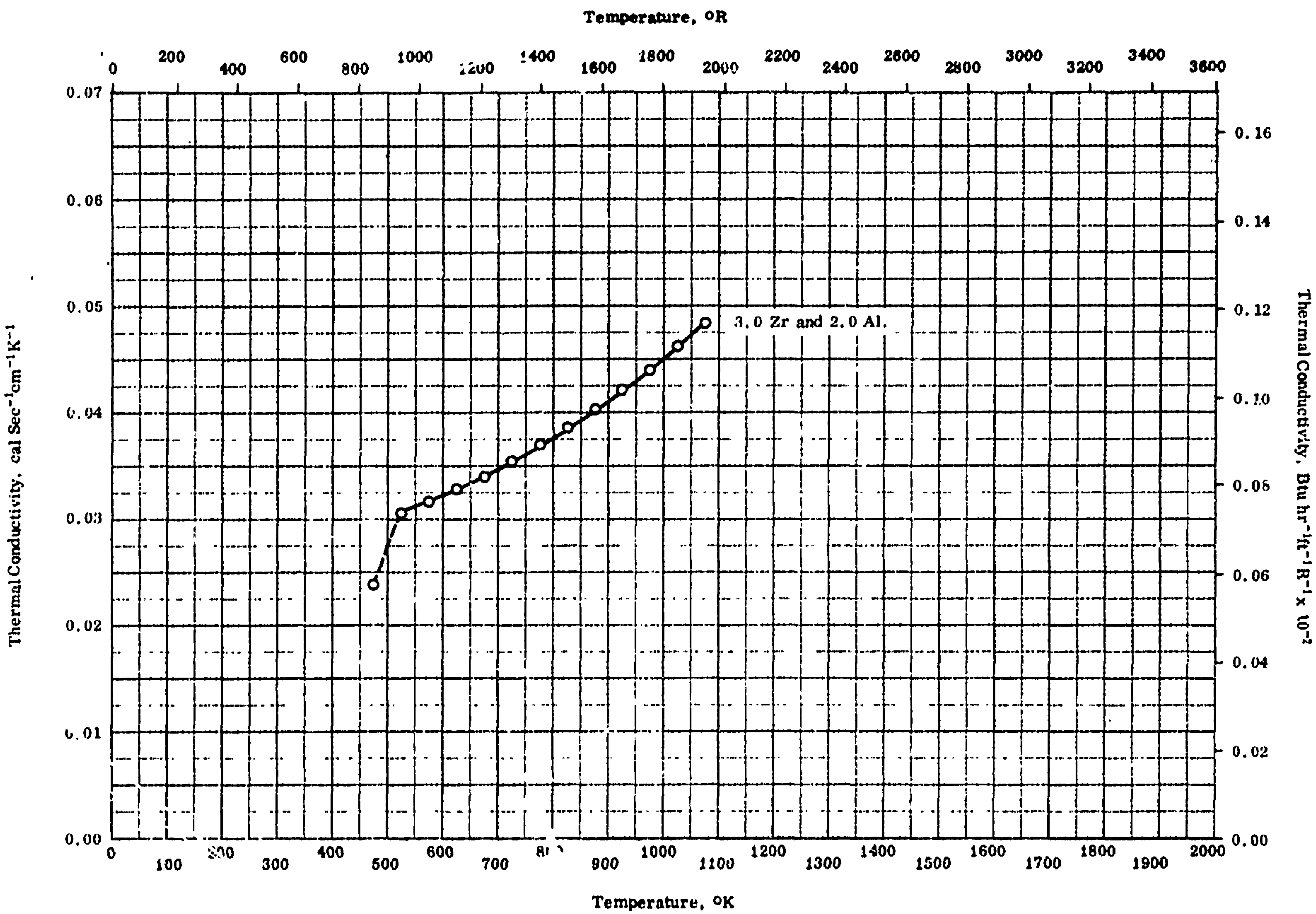
Symbol	Ref.	Temp. °K	Wavelength Range, μ	Rept. Error %	Sample Specifications	Remarks
○	61-22	298	0.4-22.0		73 Ti, 13 V, 11 Cr, and 3 Al.	Mechanically and electropolished; 10^{-5} mm Hg vacuum.
△	61-22	298	0.4-22.0		73 Ti, 13 V, 11 Cr, and 3 Al. [Author's design.: 203]	Mechanically and electropolished; anodized in sulfuric acid and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.
□	61-22	298	0.4-21.0		73 Ti, 13 V, 11 Cr, and 3 Al. [Author's design.: 207]	Mechanically polished and pickled; anodized in sulfuric acid and sealed; 10^{-5} mm Hg vacuum; 0.4×10^{-4} cm thick coating.



ELECTRICAL RESISTIVITY -- TITANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

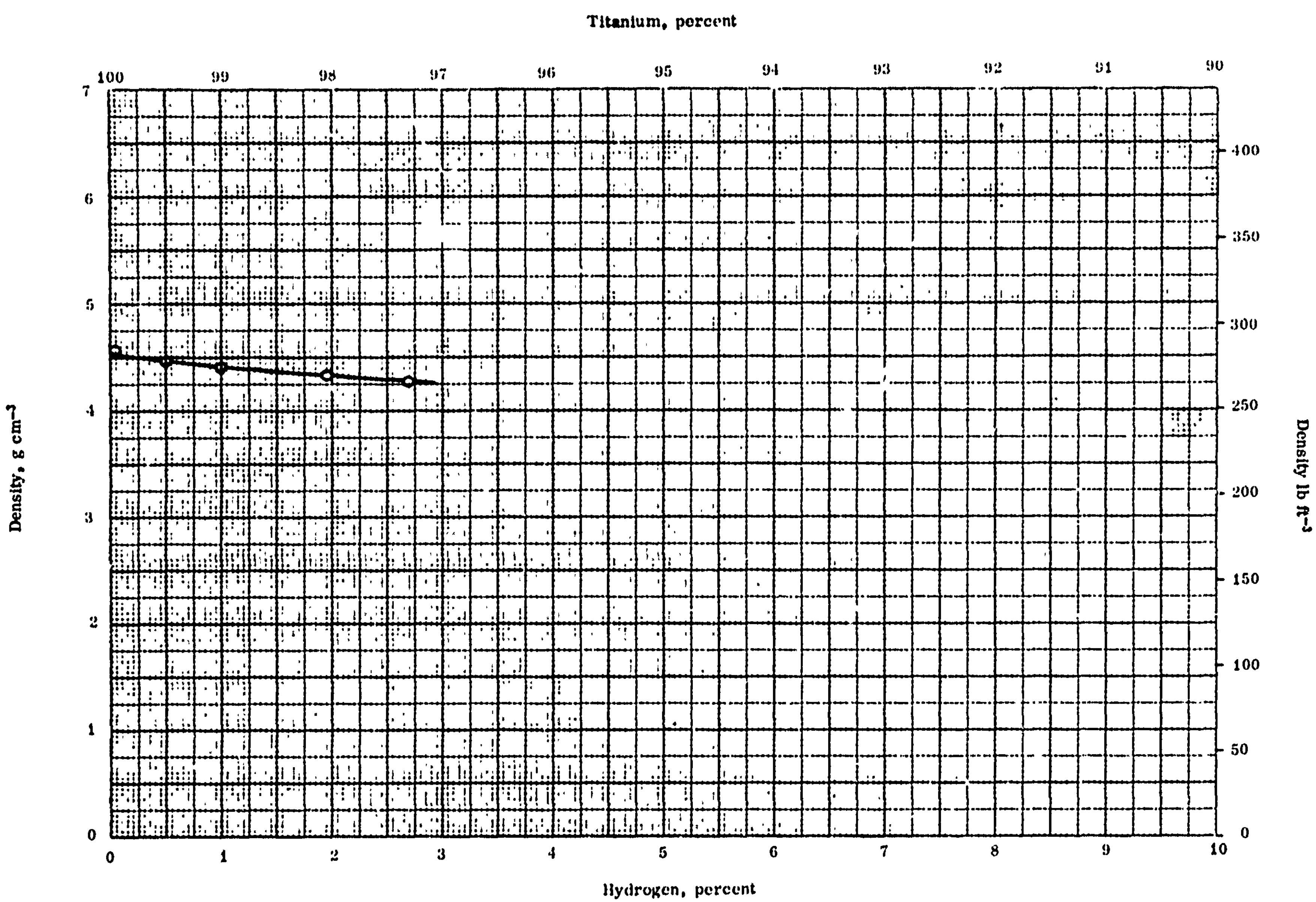
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	C1-11	323-1073		3.0 Zr and 2.0 Al.	



THERMAL CONDUCTIVITY -- TITANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

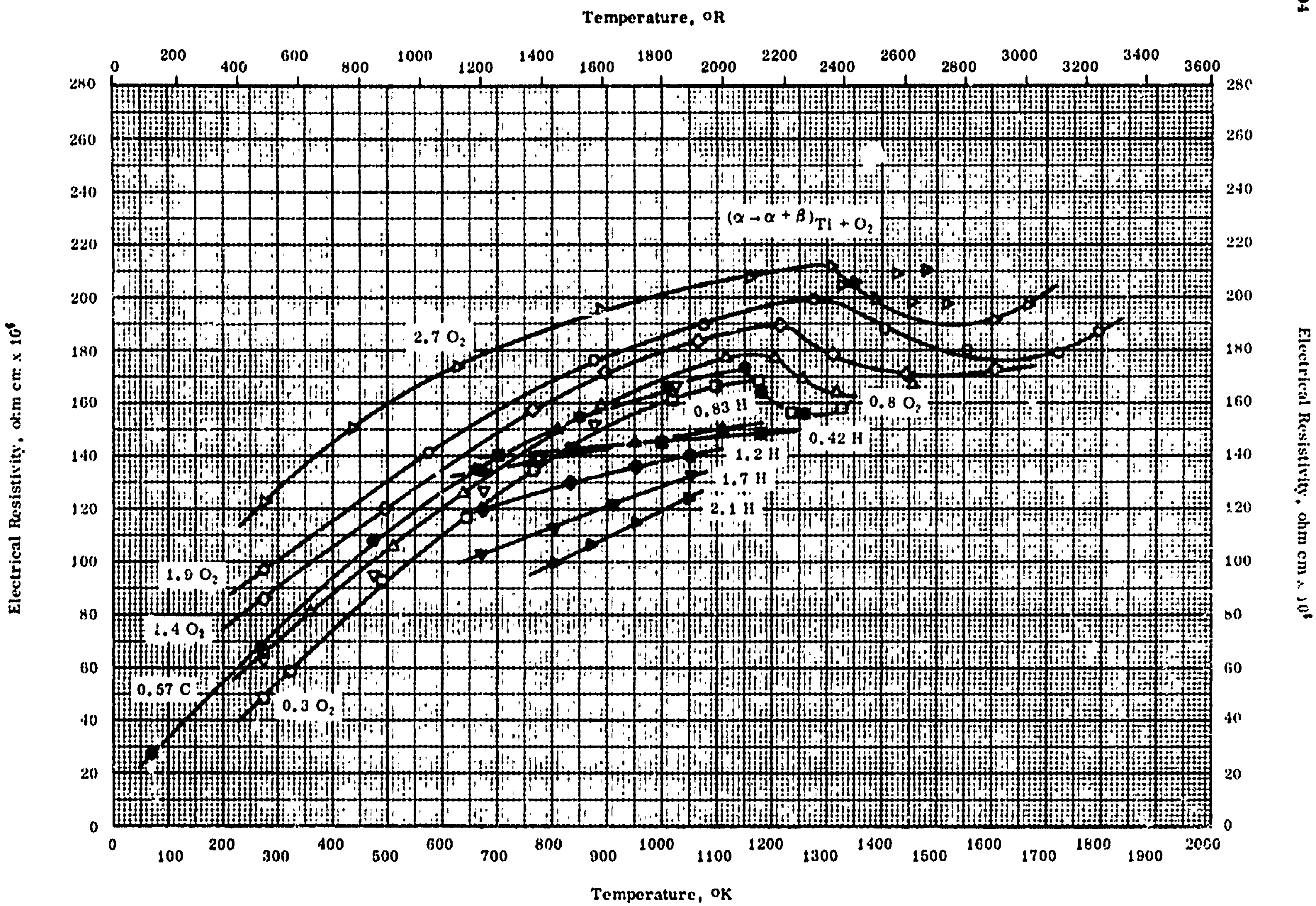
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	61-11	473-1073		3.0 Zr and 2.0 Al.	



DENSITY -- TITANIUM + ΣX_i

REFERENCE INFORMATION

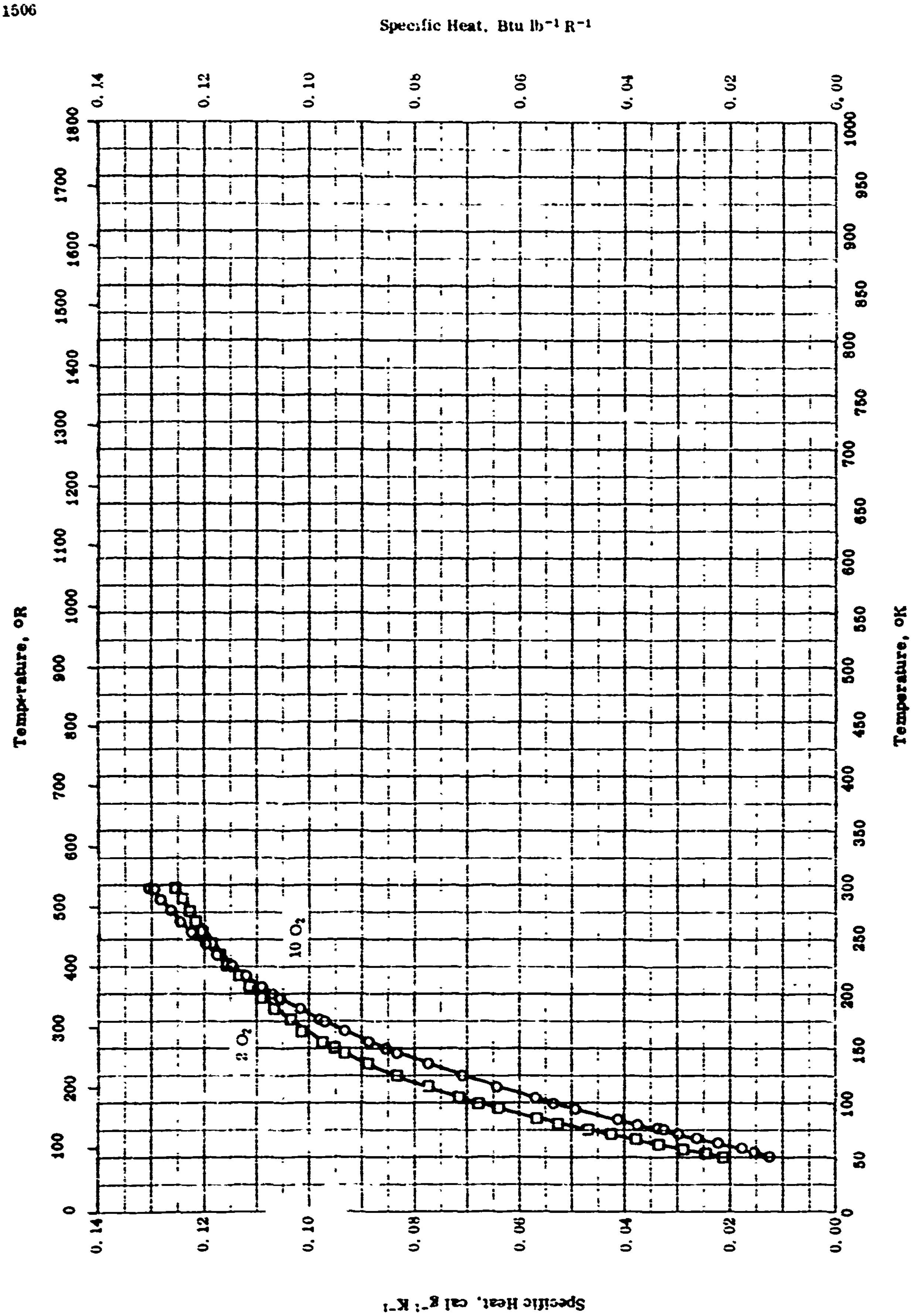
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	52-13	298		0-2.7 H; 99.92 pure Ti with 0.013 Al, 0.01 Mn, 0.004 N, 0.0035 Fe, 0.0025 Ni, 0.001 each Mo, Sn, Mg, and 0.0072± 0.0007 H_2.	Ti pre, ared from arc-melted Ti iodide or purchased pure Ti.



ELECTRICAL RESISTIVITY -- TITANIUM + ΣX_i

REFERENCE INFORMATION

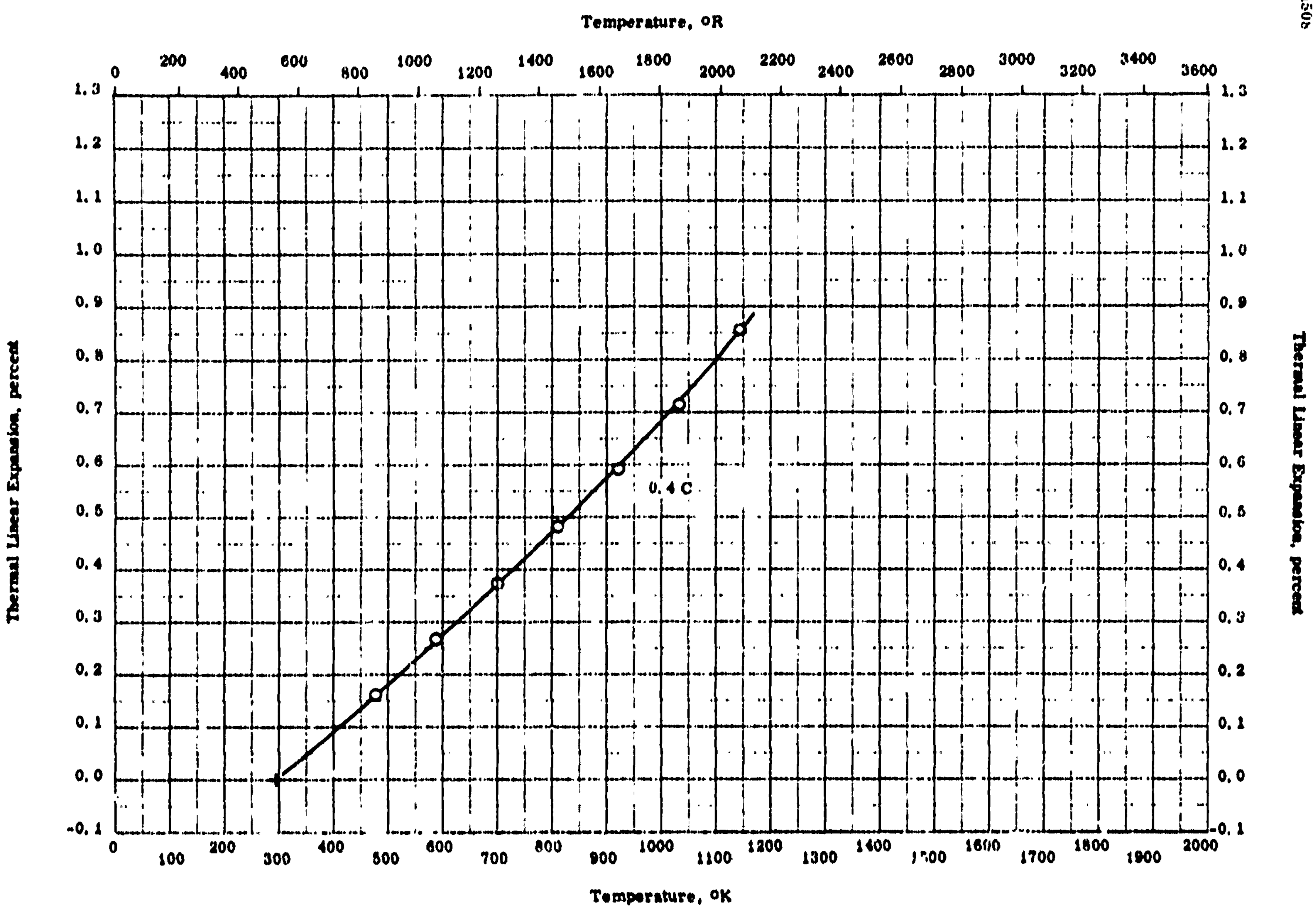
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	56-17	273-1323		0.288 O_2, 0.001 N_2 and Mo, Al, Si, Cu, Mg, Mn, Fe, Sn also present as impurities.	High purity iodide titanium and pure TiO_2 fused in He atmos. and remelted several times.
△	56-17	273-1466		0.848 O_2, 0.002 N_2 and Mo, Al, Si, Cu, Mg, Mn, Fe, Sn also present as impurities.	Same as above.
◇	56-17	273-1606		1.40 O_2, 0.002 N_2 and Mo, Al, Si, Cu, Mg, Mn, Fe, Sn also present as impurities.	Same as above.
▽	56-18	273-1023		1.45 O_2; prepared from iodide refined (α - phase) titanium and spectroscopically pure TiO_2.	
○	56-17	273-1791		1.90 O_2, 0.003 N_2 and Mo, Al, Si, Cu, Mg, Mn, Fe, Sn also present as impurities.	Same as above.
▷	56-17	273-1663		2.68 O_2, 0.006 N_2 and Mo, Al, Si, Cu, Mg, Mn, Fe, Sn also present as impurities.	Same as above.
■	56-29	673-1177		0.42 H.	Rod of iodide-titanium in equilibrium with H_2 atm.
▲	56-29	673-1111		0.83 H.	Same as above.
◆	56-29	673-1053		1.2 H.	Same as above.
▼	56-29	673-1053		1.7 H.	Same as above.
▶	56-29	673-1053		2.1 H.	Same as above.
●	57-26	77-1253		Commerical grade; 0.57 C, 0.10 O_2, and 0.05 Fe.	



SPECIFIC HEAT -- TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-14	50-298		Ti $O_{0.344}$; 10.04 O_2; prepared from extremely high purity Ti.	
□	57-14	50-298		Ti $O_{0.002}$; 2.02 O_2; raw material same as above.	



THERMAL LINEAR EXPANSION -- TITANIUM + ΣX_i

THERMAL LINEAR EXPANSION -- TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	64-33	297-1144		0.4 C.	

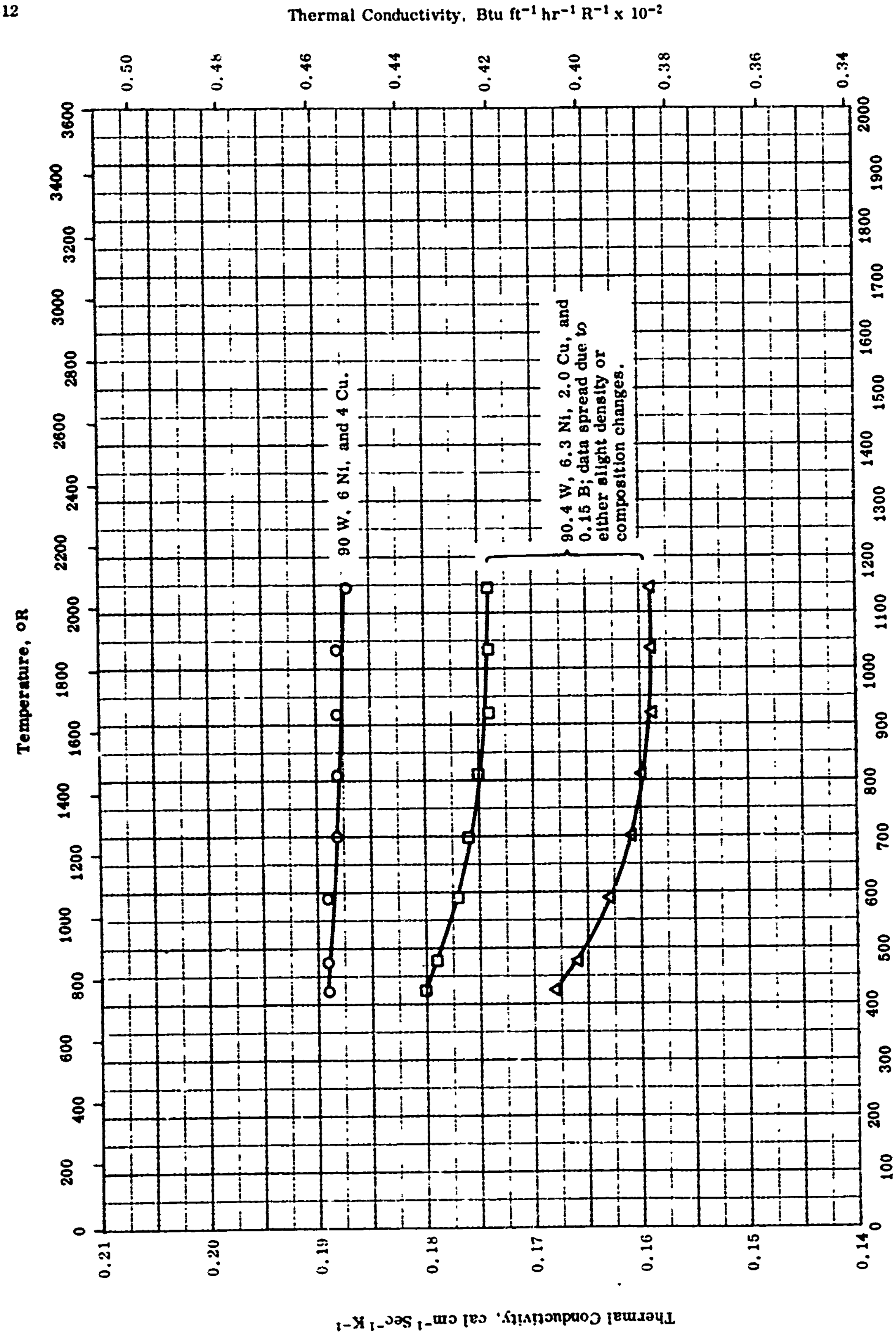
PROPERTIES OF TUNGSTEN + NICKEL + ΣX_i

REPORTED VALUES

Density:		g cm^{-3}	lb ft^{-3}
○	7 Ni and 3 Fe	17.15	1071
□	4.9 Ni and 2 Fe	17.75	1108
◇	3.5 Ni and 1.5 Fe	18.18	1135
△	7.5 Ni and 2.5 Cu	16.8 ± 0.3	1045 ± 15

REFERENCE INFORMATION

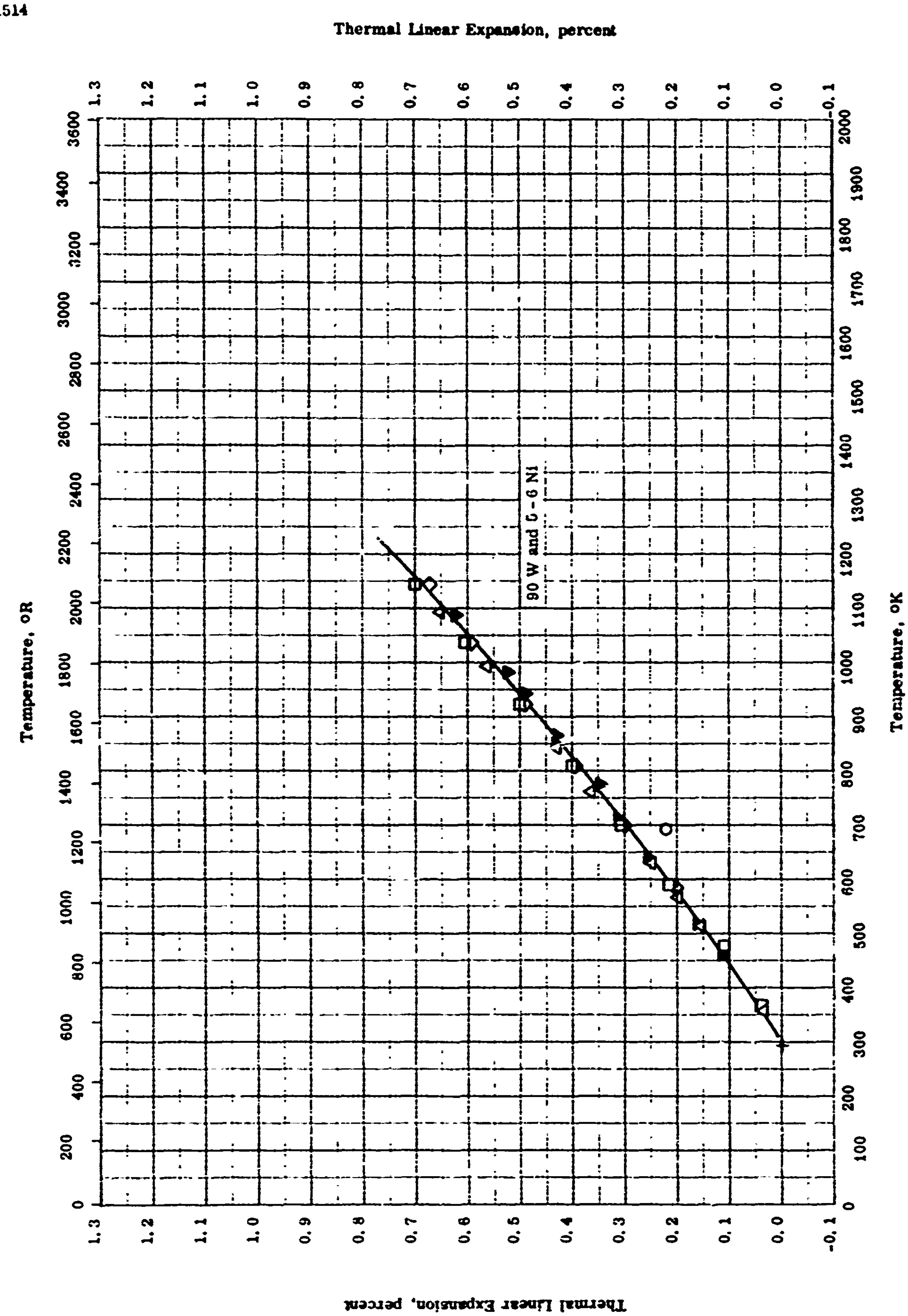
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-25	298		90 W, 7 Ni, and 3 Fe.	
□	54-25	298		93 W, 4.9 Ni, and 2.1 Fe.	
◇	54-25	298		95 W, 3.5 Ni, and 1.5 Fe.	
△	54-26	298		GEC Heavy Alloy (British design.); nominal composition: 90 W, 7.5 Ni, and 2.5 Cu.	



THERMAL CONDUCTIVITY -- TUNGSTEN + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-7	422-1144		90 W, 6 Ni, and 4 Cu.	
□	61-7	422-1144		90.4 W, 6.3 Ni, 2.0 Cu, and 0.15 B.	
△	61-7	422-1144		90.4 W, 6.3 Ni, 2.0 Cu, and 0.15 B.	Same as the above sample except either a slight density or composition changes.



THERMAL LINEAR EXPANSION -- TUNGSTEN + NICKEL + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-26	293-695		.eavy Alloy (British design.); nominal: 90 W, 7.5 Ni, and 2.5 Cu; density 1030 - 1060 lb ft^{-3}.	Made by British General Electric Co., Ltd.
□	61-7	294-1144		Mallory 1000; 90 W, 6 Ni, and 4 Cu.	Measured in argon.
△	61-7	294-1094		90.01 W, 5.81 Ni, 3.76 Cu, 0.23 B (92 B^{10} enrichment); density 16.58 g cm^{-3}. [Author's design.: Vendor A].	Measured in argon.
▼	61-7	294-1085		90.83 W, 6.32 Ni, 1.98 Cu, and 0.15 B; density 16.38 g cm^{-3}. [Author's design.: Vendor B].	Measured in argon.
◇	61-7	294-1142		90 W, 5 - 6.0 Ni, 3 - 4.0 Cu, 0.20 - 0.25 B (92 min B^{10}), 0.1 max Co, 0.01 max Cd, and 0.05 max total rare earth; density 16.7 ± 0.2 g cm^{-3}. [Author's design.: B50YA12B].	Measured in argon.

PROPERTIES OF TUNGSTEN + ΣX_i

REPORTED VALUES

Density:	g cm^{-3}	lb ft^{-3}
△ 99 W	11.00	686.7
◇ 99 W	16.4*	1024*

*Most probable value for alloys of this composition.

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
△	50-13	298		99 pure.	Pressed from - 270 mesh powder at 81500 psi to 0.569 of theoretical density.
◇	50-13	298		99 pure.	Pressed from -270 mesh powder at 81,500 psi, then fired 2-4 min at 2200 - 2300 C.

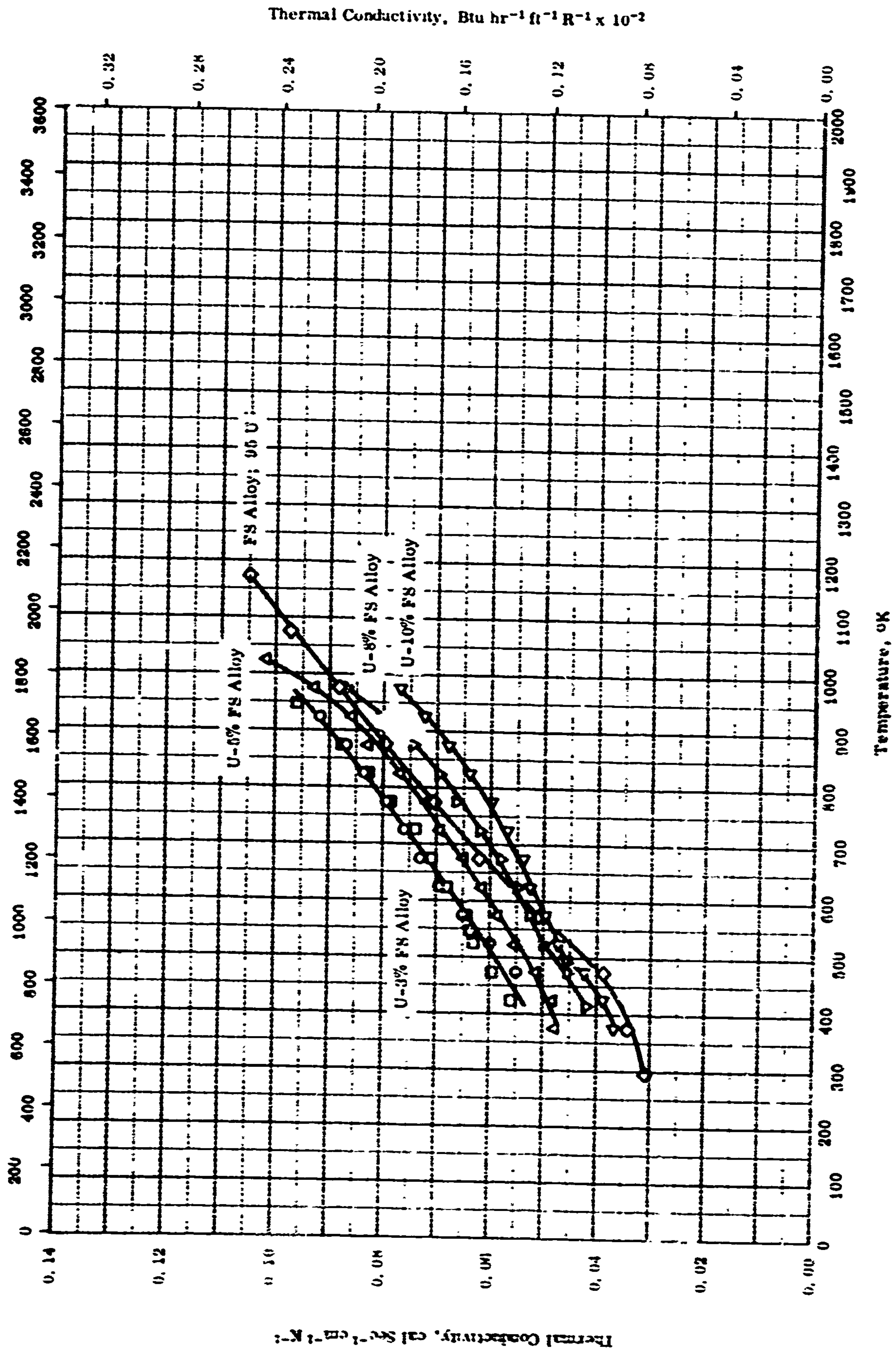
PROPERTIES OF URANIUM + MOLYBDENUM + ΣX_i

REPORTED VALUES

Melting Point:	K	R
O 2.46 Mo and 1.96 Ru	1276	2296

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	56-35	1276		Fissium alloy; nominal composition 95 U, 2.46 Mo, 1.96 Ru, 0.28 Rh, and 0.03 others.	

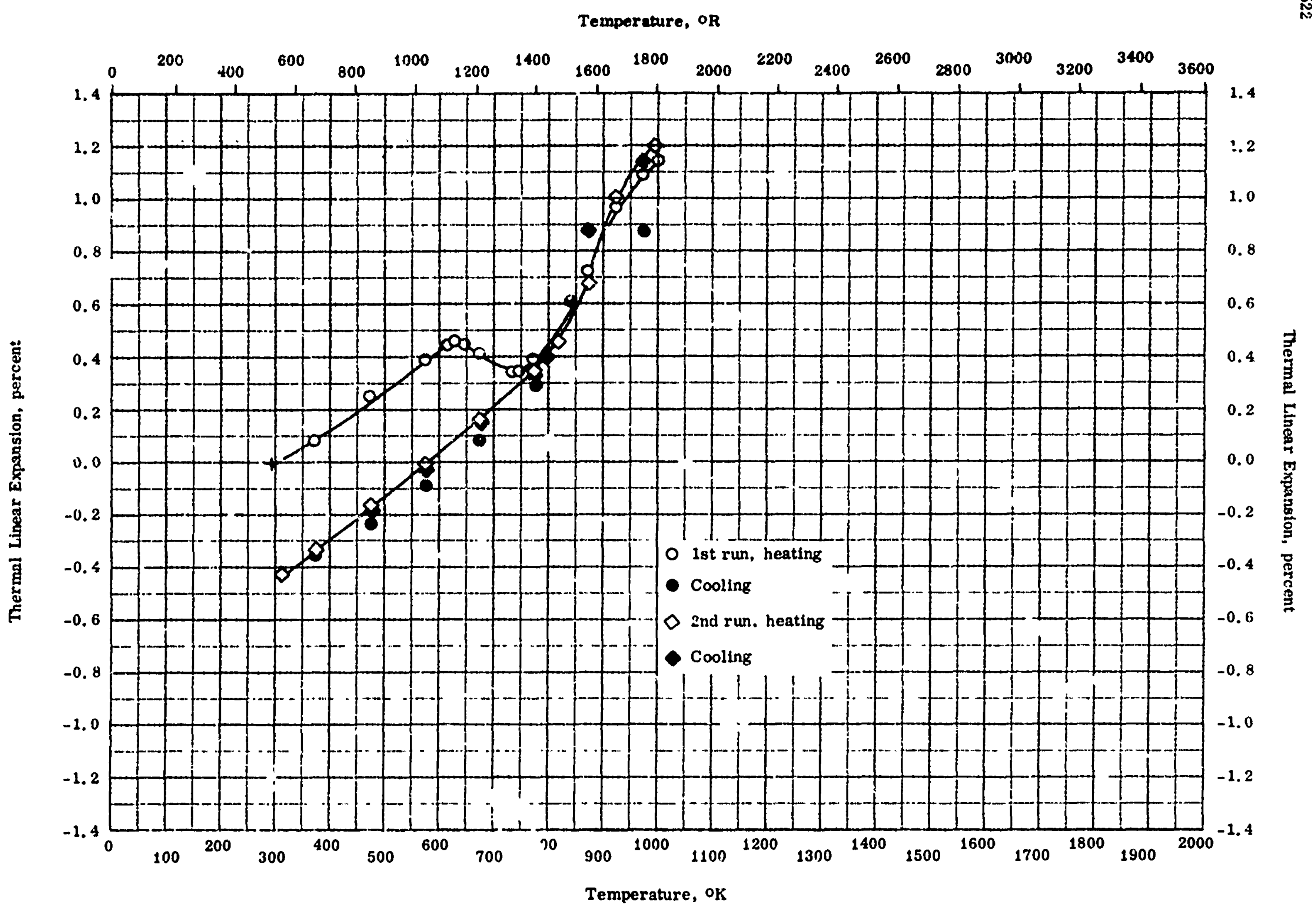


THERMAL CONDUCTIVITY -- URANIUM + MOLYBDENUM + ΣXi

THERMAL CONDUCTIVITY -- URANIUM + MOLYBDENUM + ΣXi

REFERENCE INFORMATION

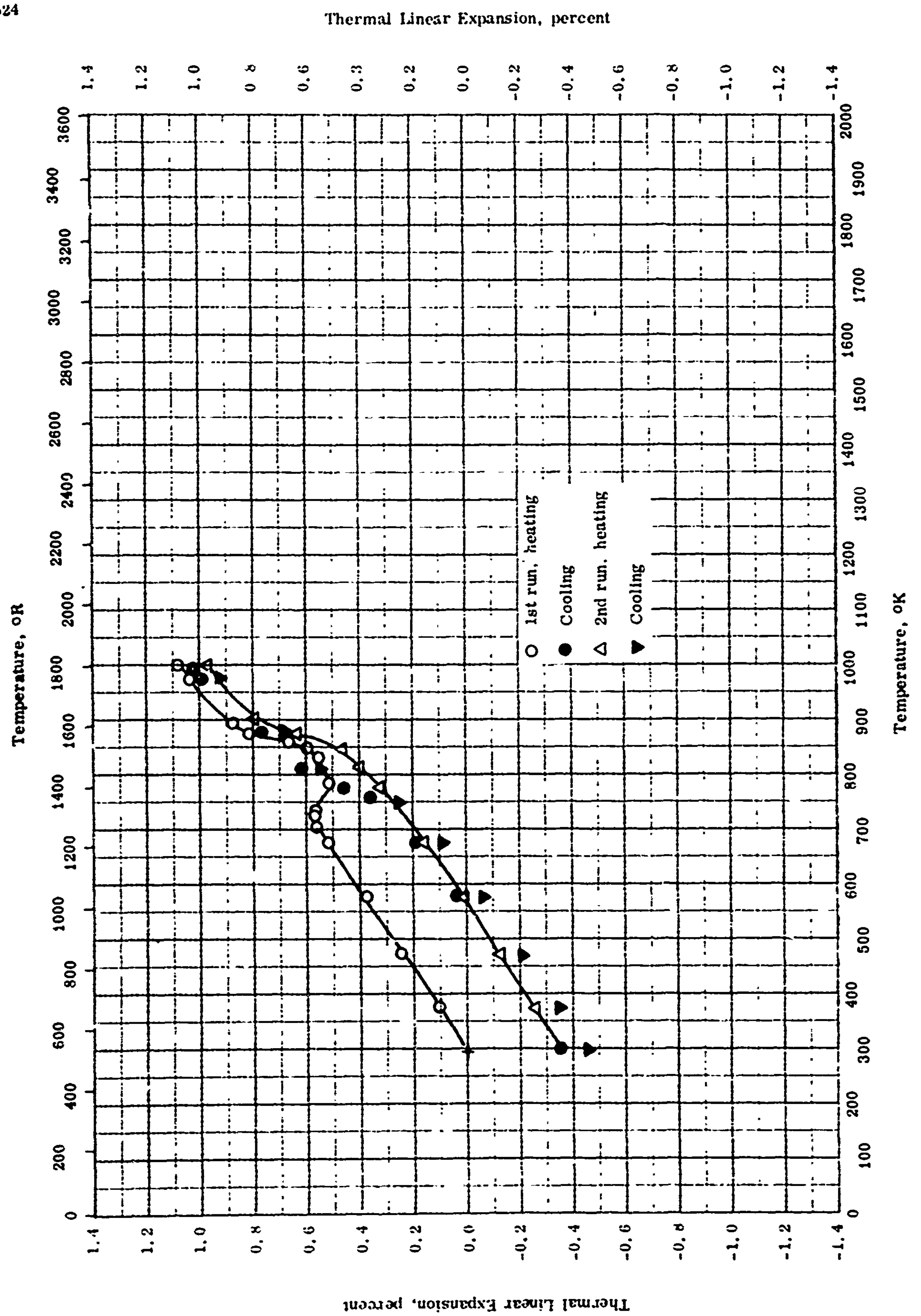
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	59-4	473-923	4	U - 3% FS Alloy: 96.974 U, 1.5 Mo, 1.2 Ru, 0.16 Rh, 0.12 Pd, 0.04 Zr, and 0.006 Nb.	Induction melted in vacuum and cast; measured using Inconel as standard.
□	59-4	423-948	4	Same as above.	Same as above except measured by using Armco Iron as standard.
△	61-8	373-1023		U - 5% FS Alloy: 95.076 U, 2.06 Mo, 1.80 Ru, 0.106 Rh, 0.136 Pd, 0.063 Zr, and 0.01 Nb.	Cast.
▽	61-8	413-973		U - 8% FS Alloy: 92.342 U, 3.73 Mo, 3.12 Ru, 0.416 Rh, 0.280 Pd, 0.096 Zr, and 0.017 Nb.	Cast.
◁	61-8	373-973		U - 10% FS Alloy: 90.334 U, 4.63 Mo, 4.00 Ru, 0.54 Rh, 0.368 Pd, 0.116 Zr, and 0.02 Nb.	Cast.
◇	67-9	293-1173		FS Alloy: 95 U, 2.40 Mo, 1.96 Ru, 0.28 Rh, 0.10 Pd, 0.10 Zr, and 0.01 Nb; nominal composition.	



THERMAL LINEAR EXPANSION -- URANIUM + MOLYBDENUM + ΣX_i
(2.4 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-30	293-1001		2.4 Mo, 2 Ru, 0.3 Rh, 0.2 Pd, 0.05 Zr, and 0.01 Nb; density 17.99 g cm^{-3}.	Prepared from as cast material; heating rate between 1 to 2 C min^{-1}; 1st run.
●	58-30	3.3-1001		Same as above.	Cooling data of above specimen.
◇	58-30	293-998		Same as above.	2nd run; heating.
◆	58-30	373-998		Same as above.	Cooling data of above specimen.



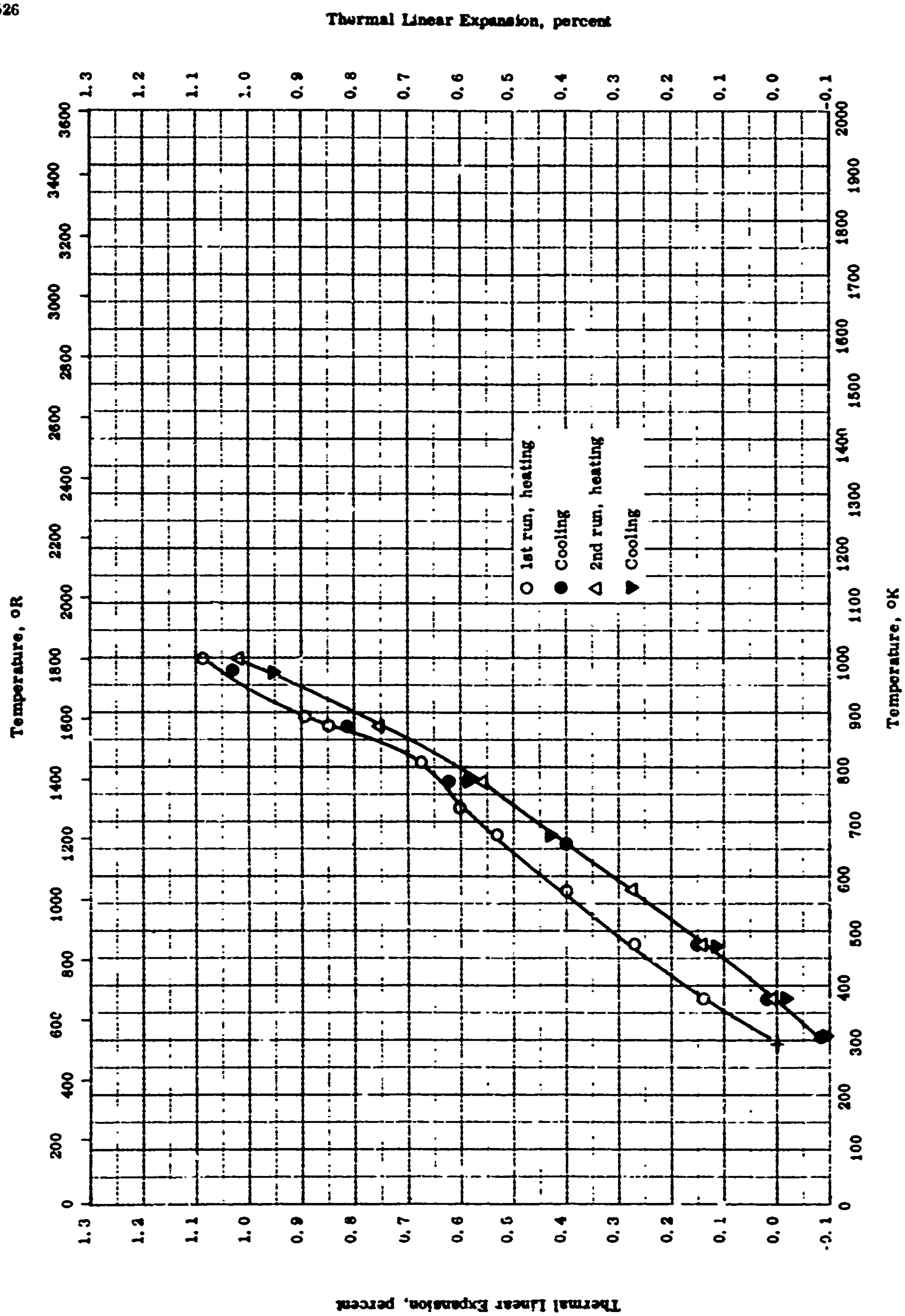
THERMAL LINEAR EXPANSION -- URANIUM + MOLYBDENUM + ΣX_i
(3.8 Mo)

THERMAL LINEAR EXPANSION -- URANIUM +MOLYBDENUM +ΣX_i

THERMAL LINEAR EXPANSION -- URANIUM +MOLYBDENUM +ΣX_i
(3.8 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-30	293-998		3.8 Mo, 3 Ru, 0.4 Rh, 0.3 Pd, 0.07 Zr, and 0.02 Nb; density 17.62 g cm^{-3}.	Prepared from as cast material; heating rate between 1 to 2 C min^{-1}; first run.
●	58-30	303-998		Same as above.	Cooling data of above specimen.
△	58-30	293-998		Same as above.	Second run; heating.
▼	58-30	303-998		Same as above.	Cooling data of above specimen.



THERMAL LINEAR EXPANSION -- URANIUM + MOLYBDENUM + ΣX_i
(4.8 Mo)

THERMAL LINEAR EXPANSION -- URANIUM + MOLYBDENUM + ΣX_i
(4.8 Mo)

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	58-30	293-998		4.8 Mo, 4 Ru, 0.6 Rh, 0.4 Pd, 0.1 Zr, and 0.02 Nb; density 17.30 g cm^{-3}.	Prepared from as cast material; heating rate between 1 to 2 C min^{-1}; first run.
●	58-30	303-998		Same as above.	Cooling data of above specimen.
△	58-30	293-998		Same as above.	Second run; heating.
▼	58-30	303-998		Same as above.	Cooling data of above specimen.

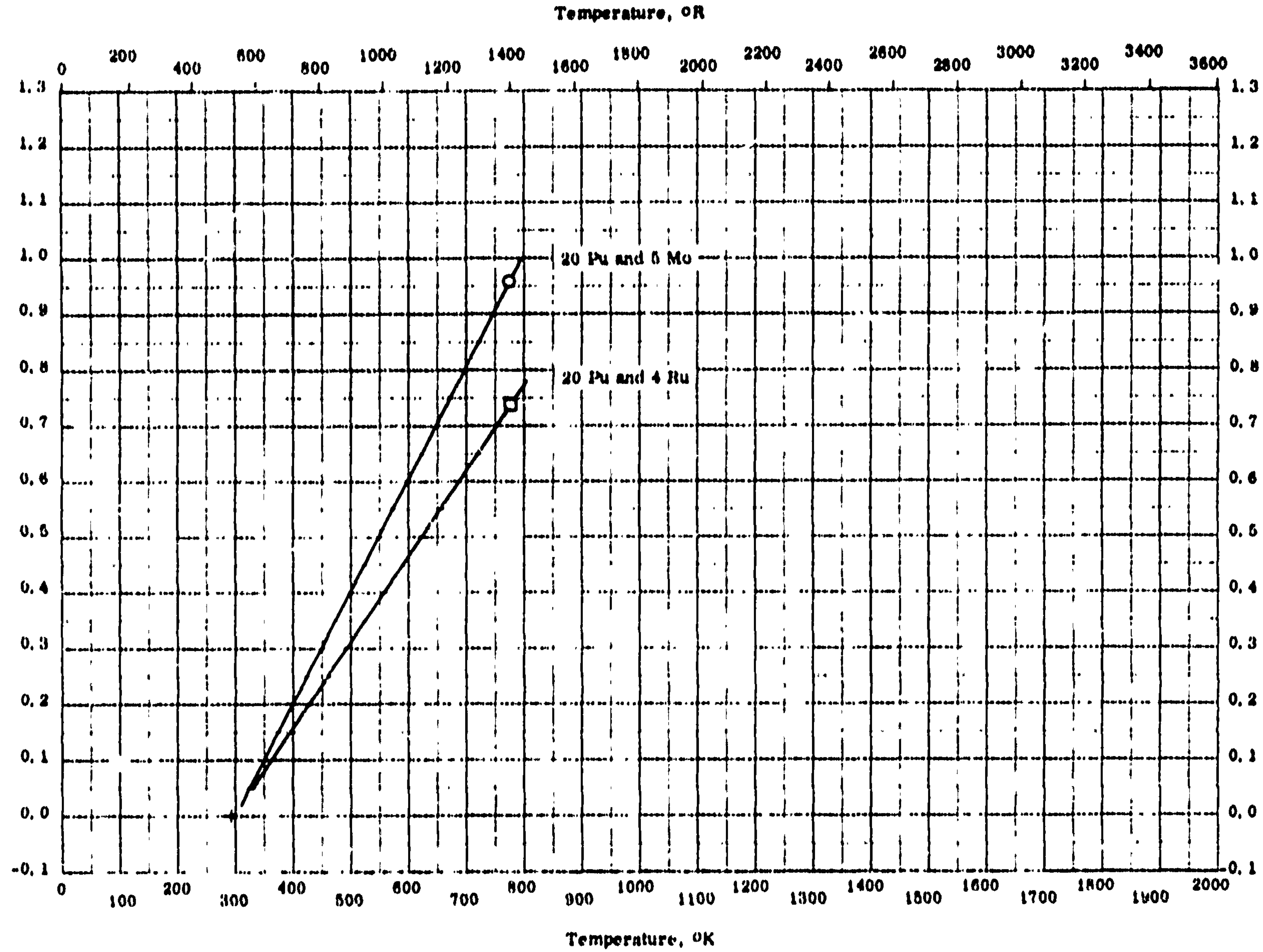
PROPERTIES OF URANIUM + PLUTONIUM + ΣX_i

REPORTED VALUES

Melting Point:	K	R
O 20 Pu and 0.25 Mo	1203	2166

REFFRENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	57-42	1203		79.5 U, 20 Pu, 0.25 Mo, 0.20 Ru, 0.03 Rh, and 0.02 others.	Containing 10% fissium.



THERMAL LINEAR EXPANSION -- URANIUM + PLUTONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	56-44	293-773		20 Pu and 5 Mo.	As cast.
□	56-44	293-773		20 Pu, 4.3 Ru, 2.8 Mo, 2.5 Pd, 0.7 Rh, and 0.5 Zr.	Same as above.

PROPERTIES OF URANIUM - THORIUM - ΣX_i

REPORTED VALUES

Melting Point:	K	R
O 4.25 Th and 3.86 Zr	1428	2570
□ 33.3 Th and 33.3 Zr	1477	2659

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-14	1428-1533		90 U, 4.25 Th, and 3.86 Zr.	M.P. by observing first liquid drop.
□	50-14	1428-1533		33.3 U, 33.3 Th, and 33.3 Zr.	Same as above.

PROPERTIES OF URANIUM + ZIRCONIUM + ΣX_i

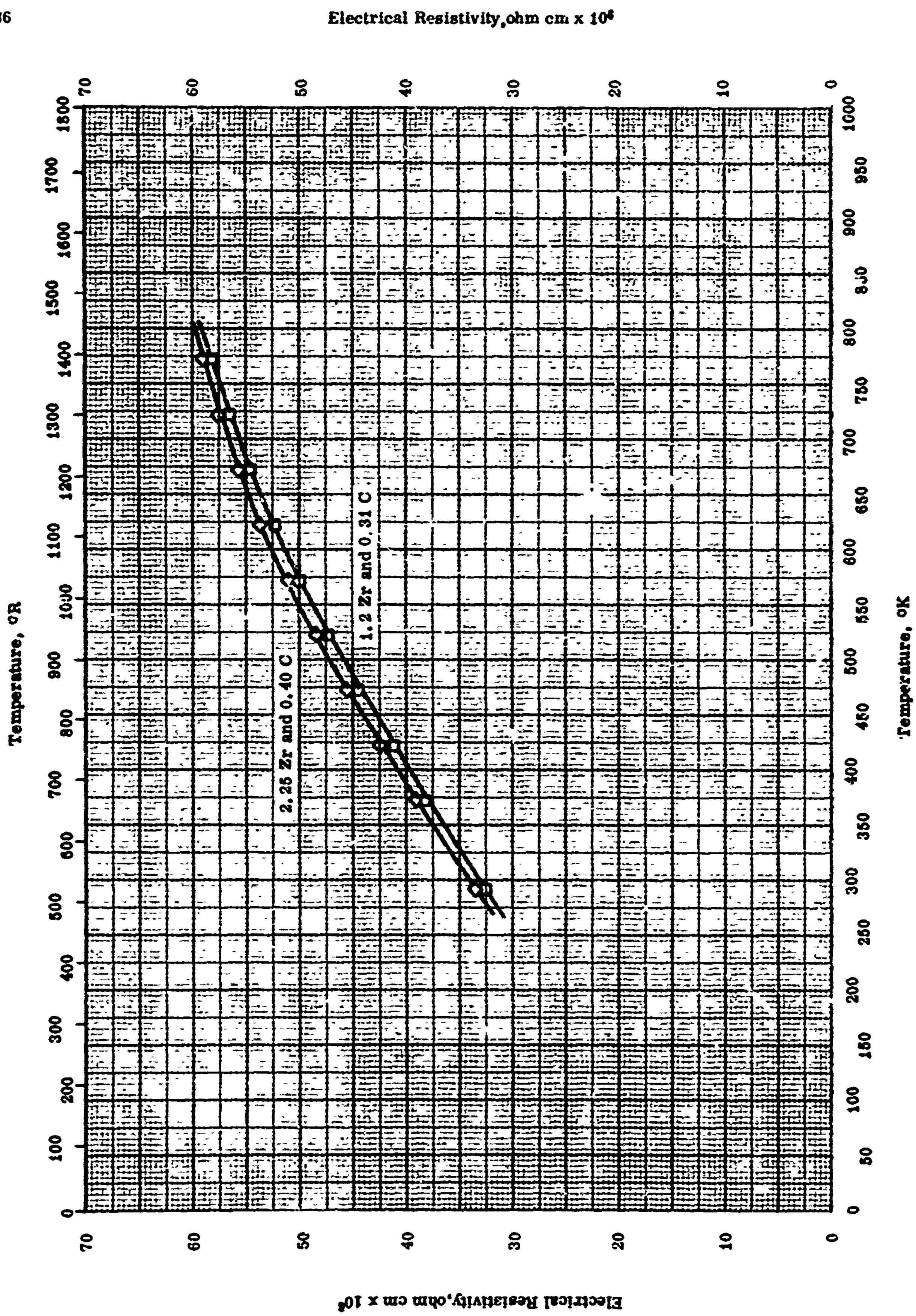
REPORTED VALUES

Melting Point:	K	R
O 33.3 Zr and 33.3 Th	1477	2659

PROPERTIES OF URANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	50-14	1477		33.3 U, 33.3 Zr, and 33.3 Th.	M.P. by observing the first liquid drop.

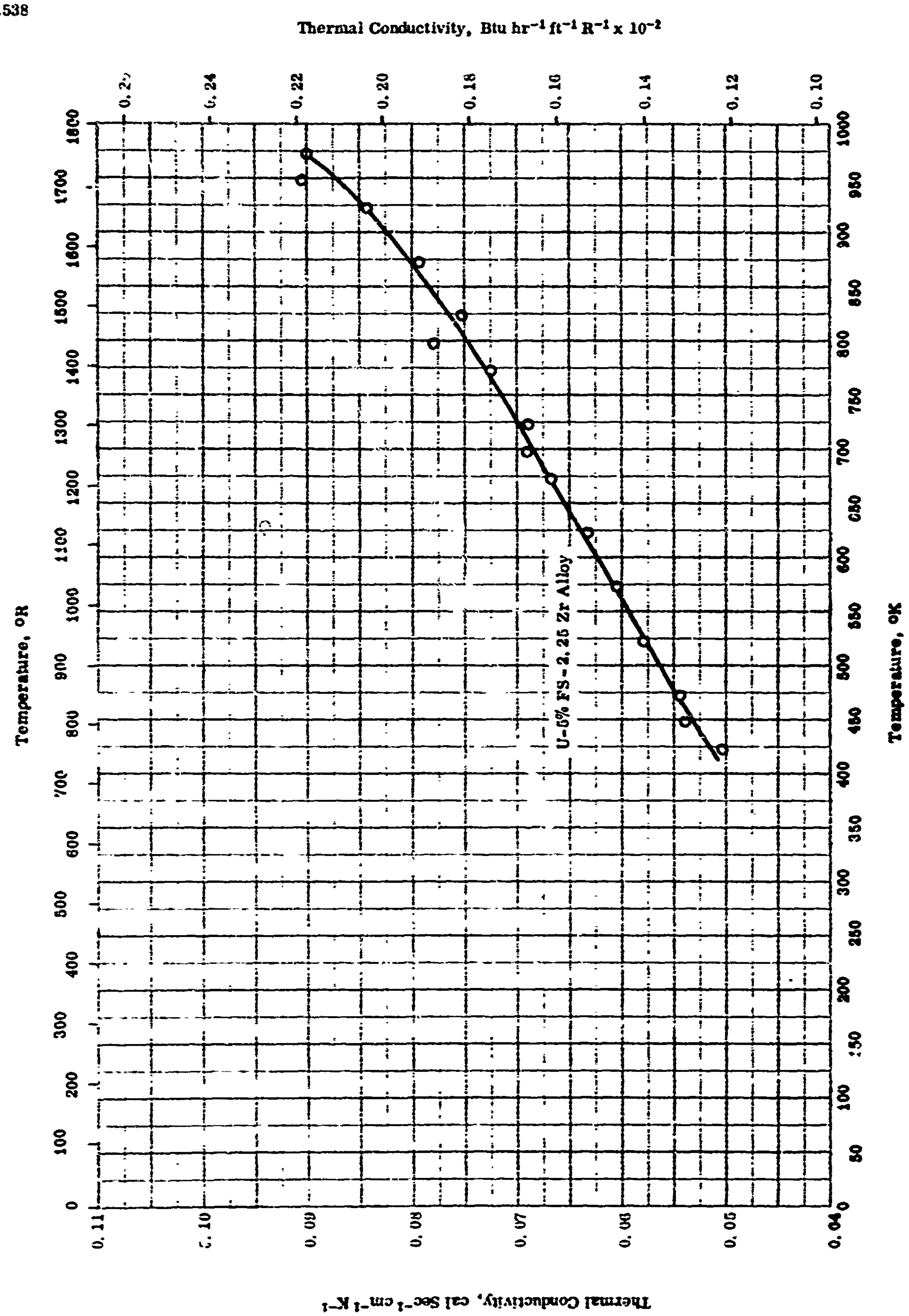


ELECTRICAL RESISTIVITY -- URANIUM + ZIRCONIUM + ΣX_i

ELECTRICAL RESISTIVITY -- URANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
□	55-21	292-1073		1.22 Zr and 0.31 C.	Heated 1 hr at 725 C in vacuum and water quenched.
◇	55-21	293-1073		2.25 Zr and 0.40 C.	Heated 1 hr at 800 C in vacuum, 1 hr at 500 C, and air cooled.

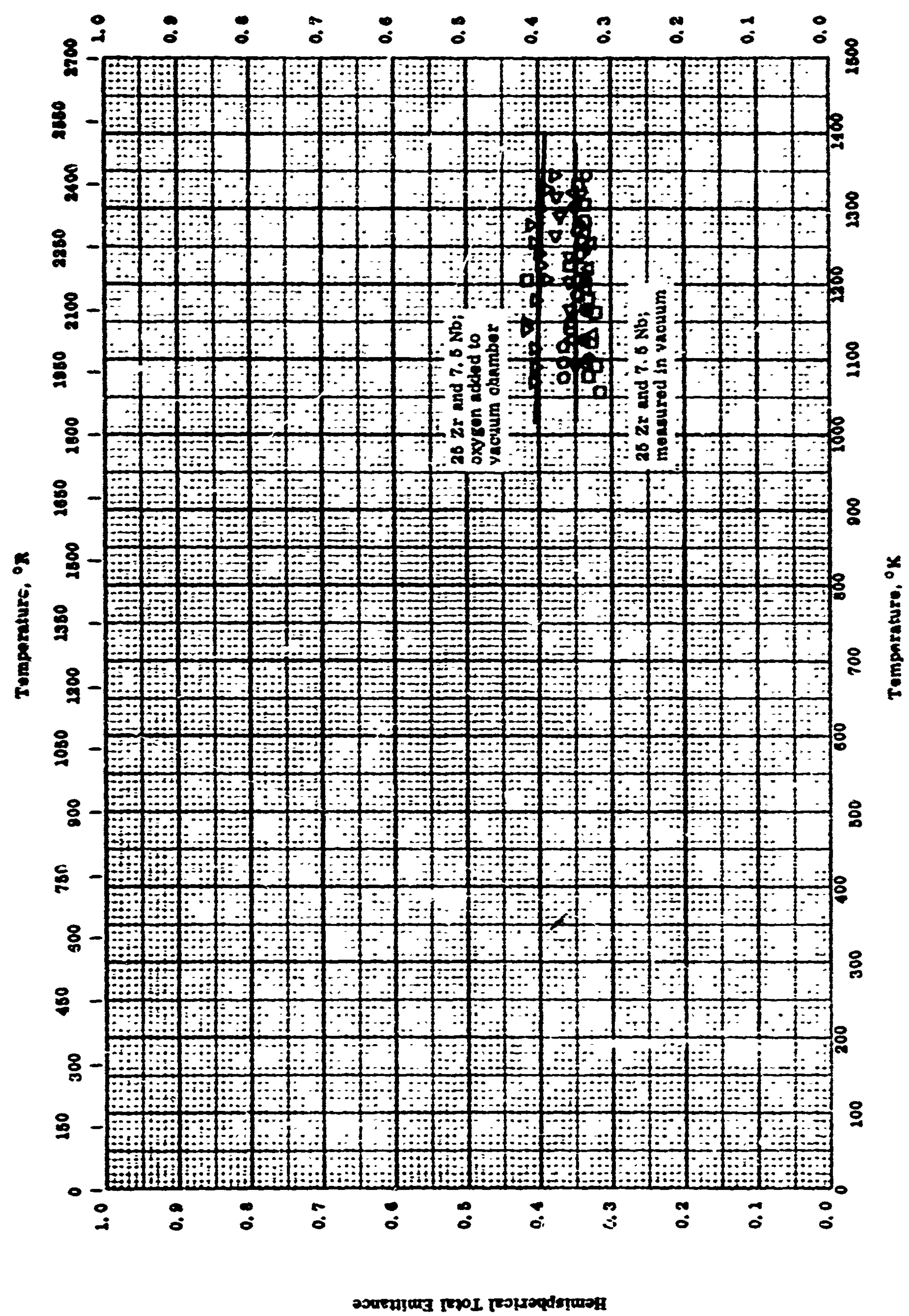


THERMAL CONDUCTIVITY -- URANIUM + ZIRCONIUM + ΣX_i

THERMAL CONDUCTIVITY -- URANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	61-8	432-973		U - 5% FS - 2.25 Zr alloy; 2.54 Zr, 1.86 Mo, 1.76 Ru, 0.189 Rh, 0.136 Pd, and 0.01 Nb.	Cast.

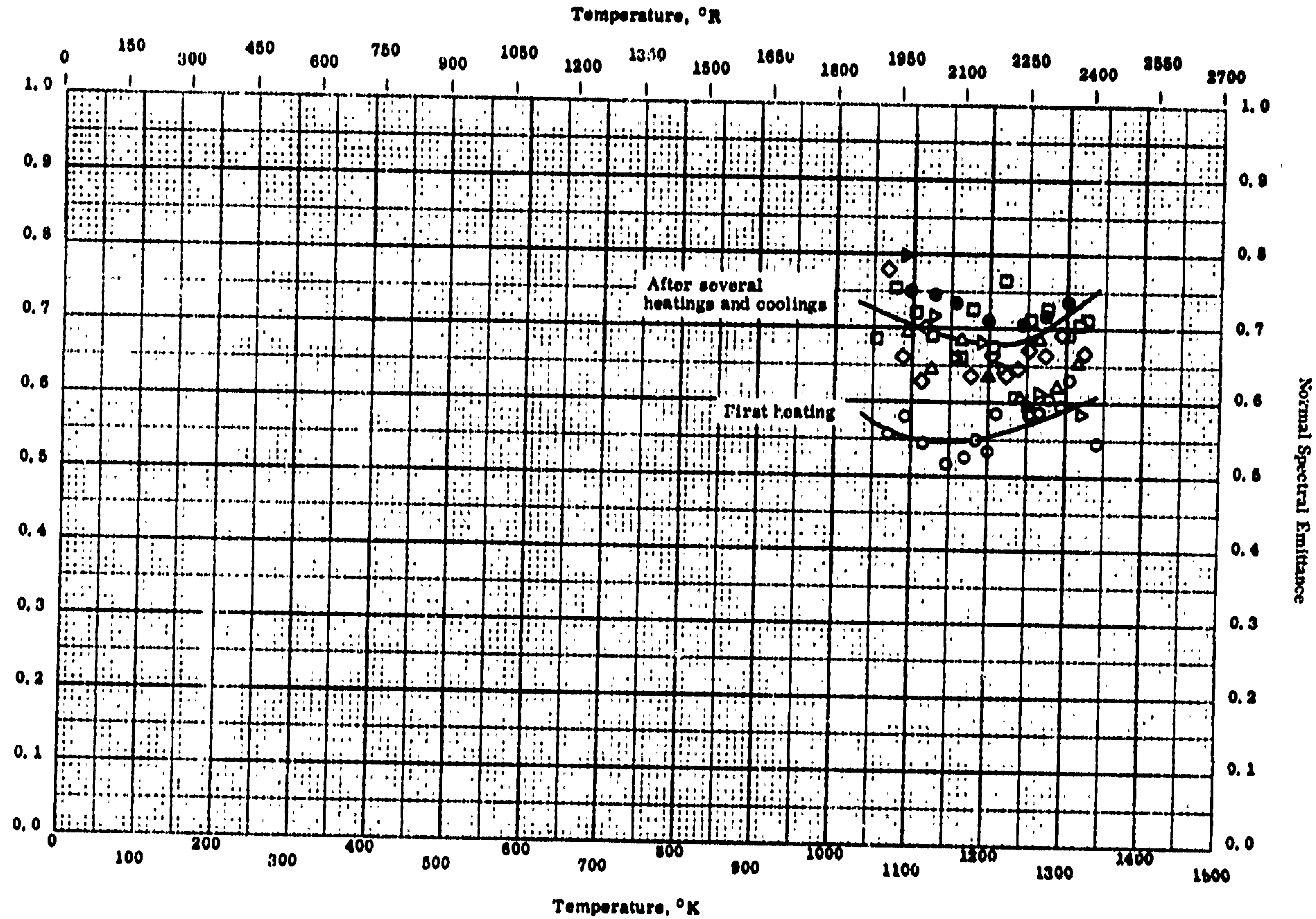


HEMISPHERICAL TOTAL EMITTANCE -- URANIUM + ZIRCONIUM + ΣX_i

HEMISPHERICAL TOTAL EMITTANCE -- URANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-49	1074-1341		75 (U + 10 Nb) and 25 Zircaloy 2; nominal: 67.5 U, 24.55 Zr, 7.5 Nb, 0.375 Sn, 0.0375 Fe, 0.025 Cr, and 0.0125 Ni.	Rolled at 815 C then annealed, quenched, and cold rolled; measured in vacuum; first heating.
△	57-49	1091-1321		Same as above.	The above specimen; first cooling.
□	57-49	1056-1330		Same as above.	The above specimen; second heating.
●	57-49	1100-1301		Same as above.	The above specimen; second cooling.
▽	57-49	1070-1344		Same as above.	The above specimen; 6 charges of oxygen added to vacuum chamber; (single charge of oxygen equal to 2.5 cm^3 at 1 atm. 1173 K); chamber at pressure of 2×10^{-5} mm Hg, prior to addition of oxygen charge; first heating.
◁	57-49	1091-1315		Same as above.	The above specimen; first cooling.



NORMAL SPECTRAL EMITTANCE -- URANIUM + ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	57-49	0.65	1071-1340		75 (U + 10 Nb) and 25 Zircaloy 2; nominal: 67.5 U, 24.55 Zr, 7.5 Nb, 0.375 Sn, 0.0375 Fe, 0.025 Cr, and 0.0125 Ni.	Rolled at 1088K then annealed, quenched, and cold rolled; measured in vacuum; first heating.
▷	57-49	0.65	1091-1324		Same as above.	The above specimen; first cooling.
□	57-49	0.65	1055-1328		Same as above.	The above specimen; second heating.
●	57-49	0.65	1098-1301		Same as above.	The above specimen; second cooling.
◇	57-49	0.65	1069-1323		Same as above.	The above specimen; 6 charges (2.5 cm^3 at atmospheric pressure per charge) of oxygen added to vacuum chamber (chamber at 2×10^{-5} mm Hg and specimen at approximately 1173 K).
△	57-49	0.65	1095-1315		Same as above.	The above specimen; first cooling.

PROPERTIES OF URANIUM + ΣX_i

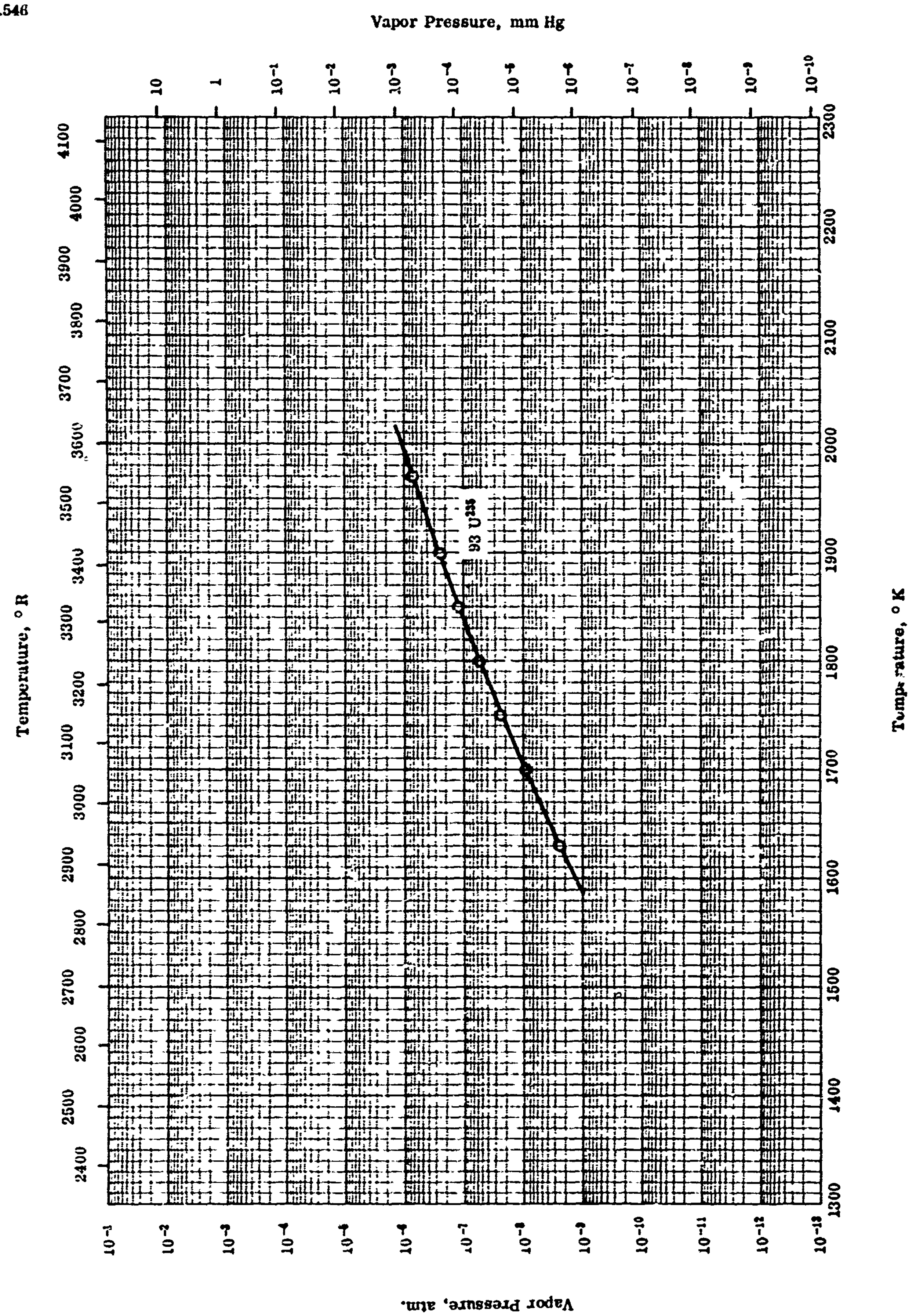
REPORTED VALUES

	cal g^{-1}	Btu lb^{-1}
Heat of Fusion:		
○ 93 U^{235}	$20_{1406\,K}$	$36_{2531\,R}$
Heat of Vaporization:		
□ 93 U^{235}	$453.7 \pm 0.4_{1406\,K}$	$816.6 \pm 0.8_{2531\,R}$
Heat of Sublimation:		
△ 93 U^{235}	$495.7 \pm 0.4_{0\,R}$	$892.3 \pm 0.8_{0\,R}$

PROPERTIES OF URANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	54-7 also 54-8	1406		93 pure U^{235}.	Δh_f from vapor pressure data.
□	54-7 also 54-8	1406		93 pure U^{235}.	Δh_v from vapor pressure data.
△	54-7 also 54-8	0		93 pure U^{235}.	Δh_s from vapor pressure data.

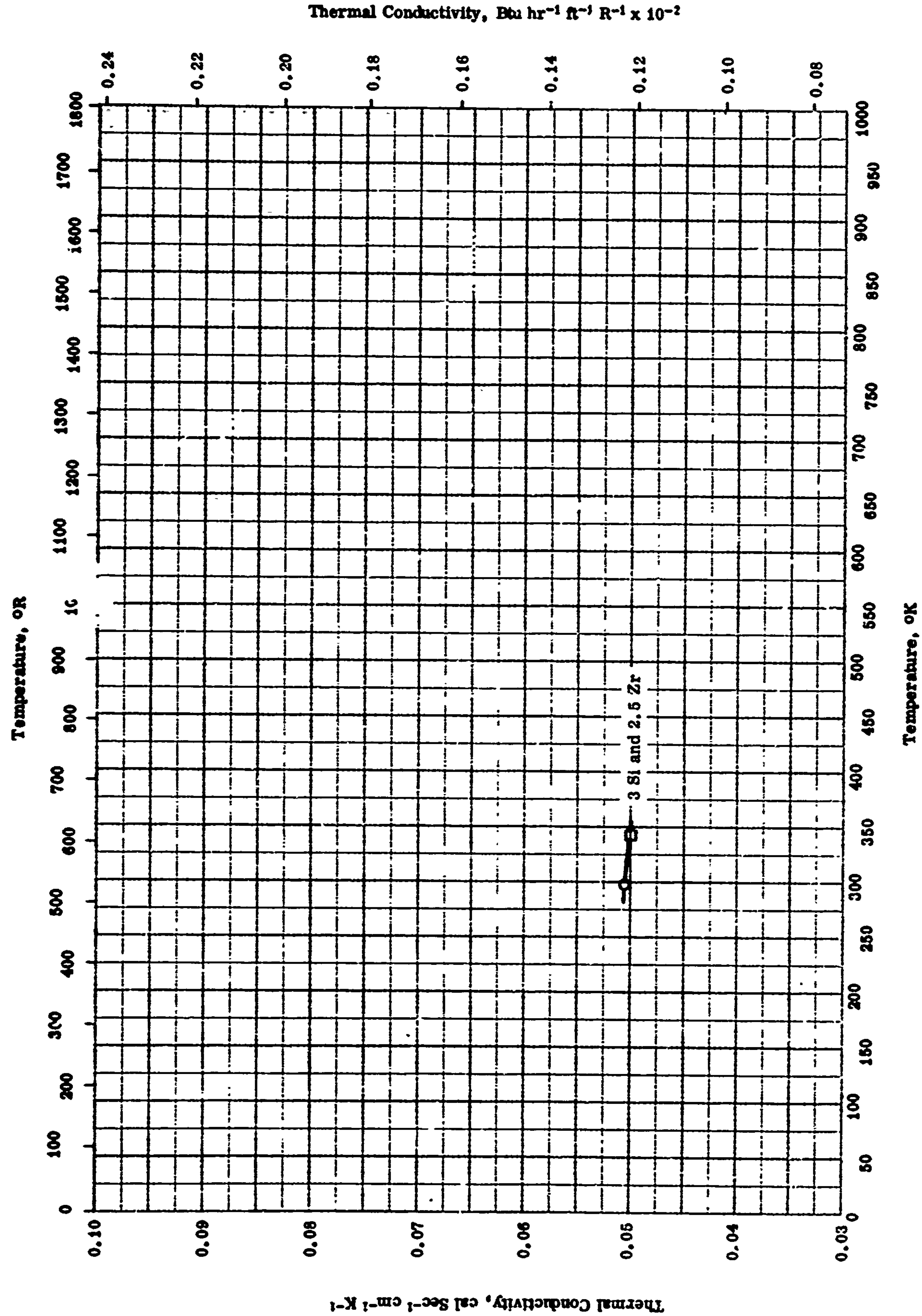


VAPOR PRESSURE -- URANIUM + ΣX_i

VAPOR PRESSURE -- URANIUM + ΣX;

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	54-8 also 54-7	1630-1970		93 U^{235}.	Received as wire; cleaned anodically in 46% H_2SO_4 + 6% glycerin; results corrected for residual O_2 and Ta impurities (capsule).

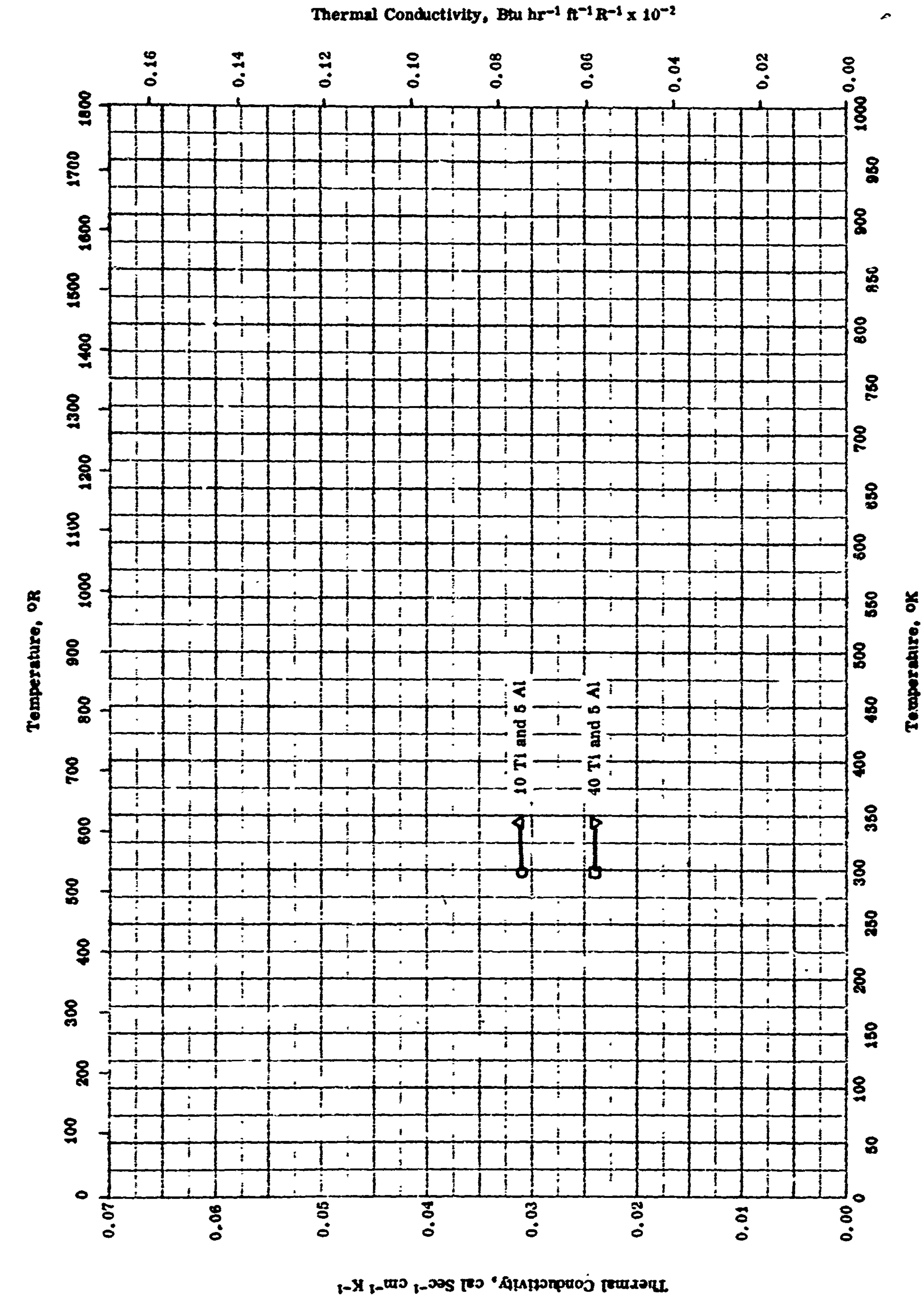


THERMAL CONDUCTIVITY -- VANADIUM + SILICON + ΣX_i

THERMAL CONDUCTIVITY -- VANADIUM + SILICON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-5	298		3 Si and 2.5 Zr.	
□	55-5	343	±3	3 Si and 2.5 Zr; calcium-reduced 99.6+ V and 99+ Si and Zr; homogeneous.	Alloy formed by arc melting raw materials and remelted several times without opening furnace to insure homogeneity; forged and machined.



THERMAL CONDUCTIVITY -- VANADIUM + TITANIUM + ΣX_i

THERMAL CONDUCTIVITY -- VANADIUM + TITANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-5	298		10 Ti and 5 Al.	
□	57-5	298		40 Ti and 5 Al.	
△	55-5	343	±3	10 Ti and 5 Al; calcium-reduced 99.6⁺ V and 99⁺ Ti and Al; homogeneous.	Alloy formed by arc melting raw materials and remelted several times without opening furnace to insure homogeneity; forged and machined.
▽	55-5	343	±3	40 Ti and 5 Al; same as above.	Same as above.

PROPERTIES OF YTTRIUM + TERBIUM + ΣX_i

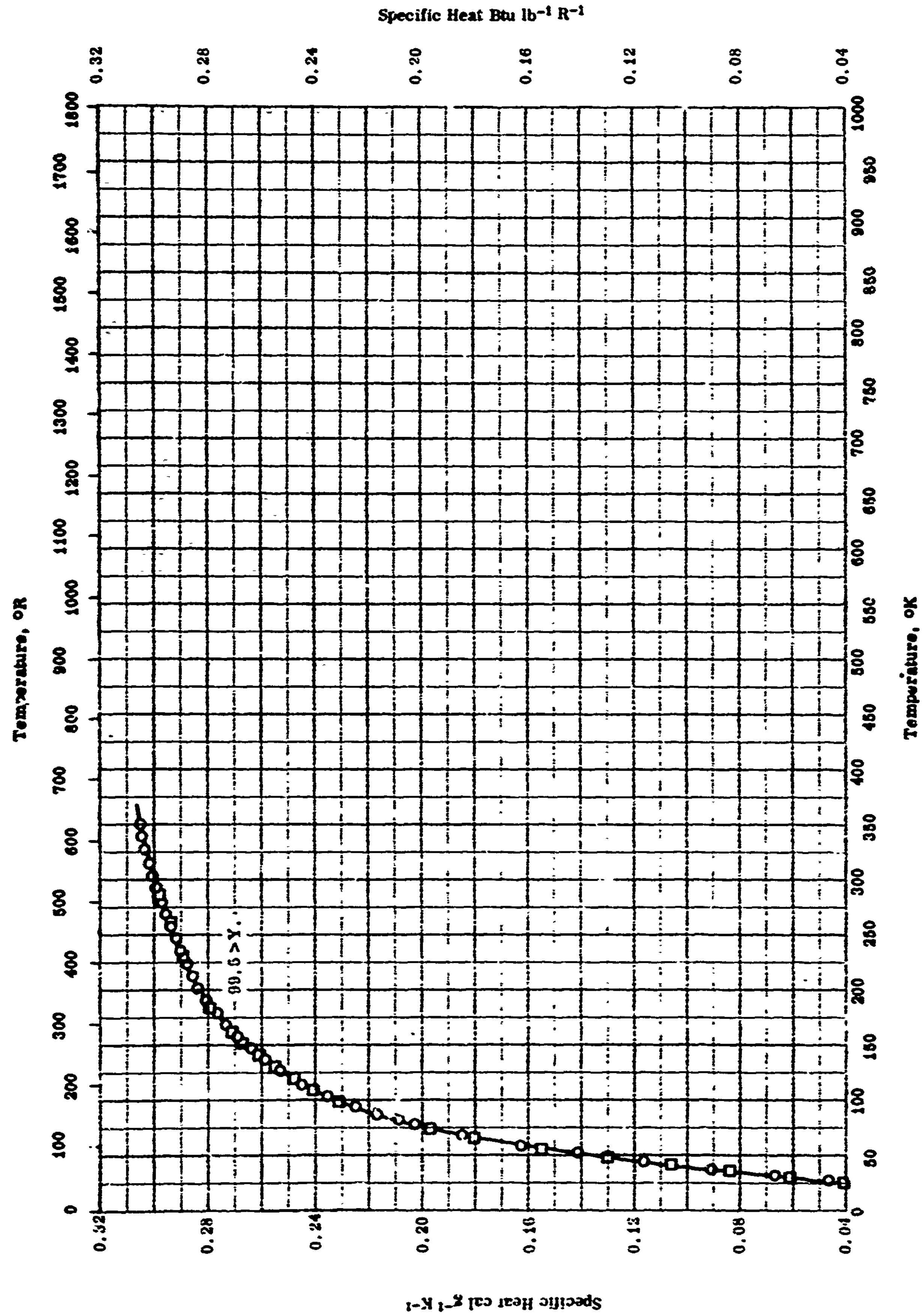
REPORTED VALUES

Density	g cm^{-3}	lb ft^{-3}
O 0.5 Tb and 0.2 Dy	4.55	284

PROPERTIES OF YTTRIUM + TERBIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	55-22	298		0.5 Tb, 0.2 Dy, 0.1 Er, traces of Fe, and weak lines of Al, Ca, Mg, and Si.	Density from weight in air and in CCl_4.

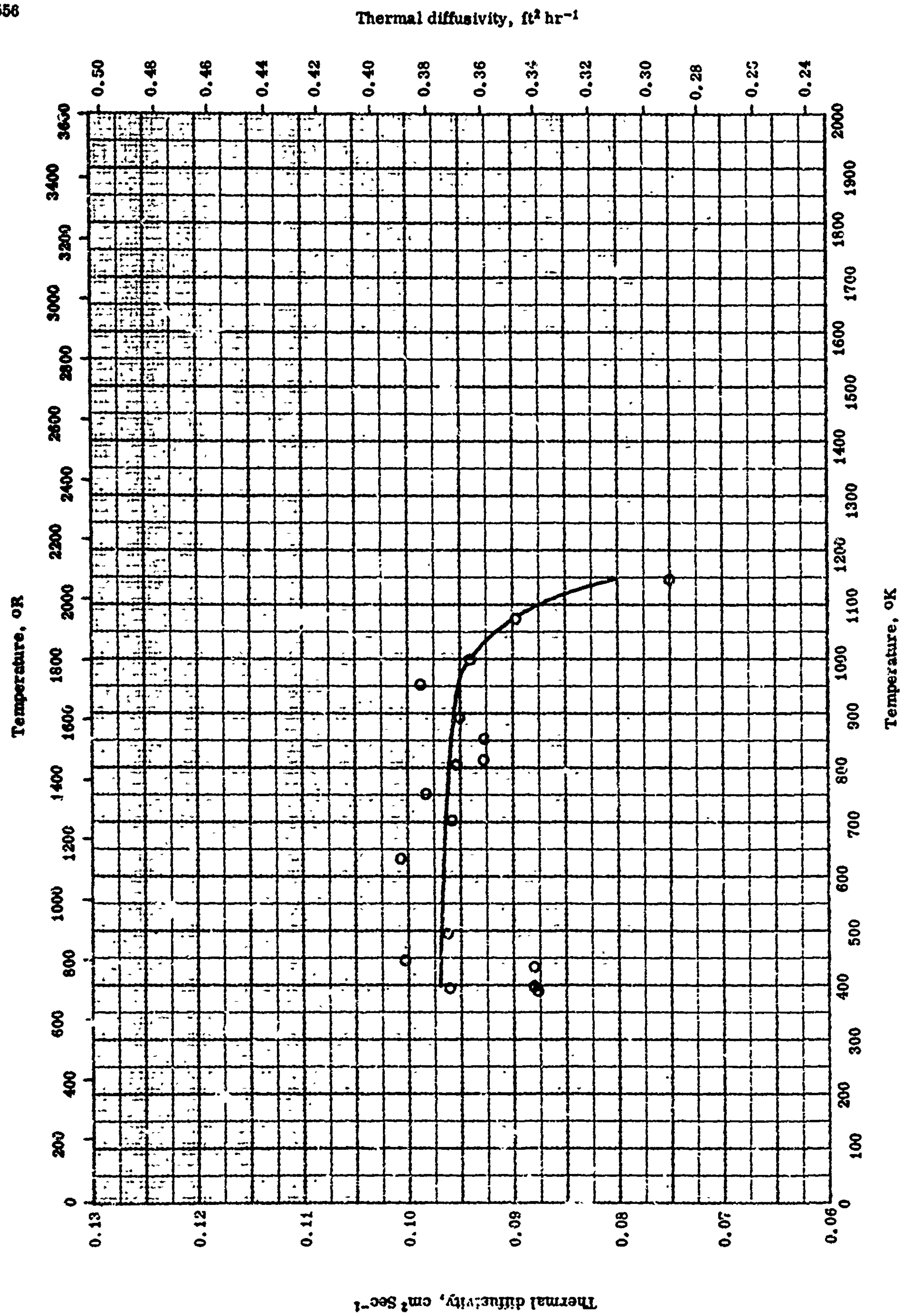


SPECIFIC HEAT -- YTTRIUM + ΣX_i

SPECIFIC HEAT -- YTTRIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	60-14	12-350		Before test: < 0.5 total of Ca, Cr, Dy, Gd, Mg, 0.025 N_2, 0.016 C; after test: 0.97 YOF, 0.44 Ta.	Run 1.
□	60-14	12-332		Same as above.	Run 2.

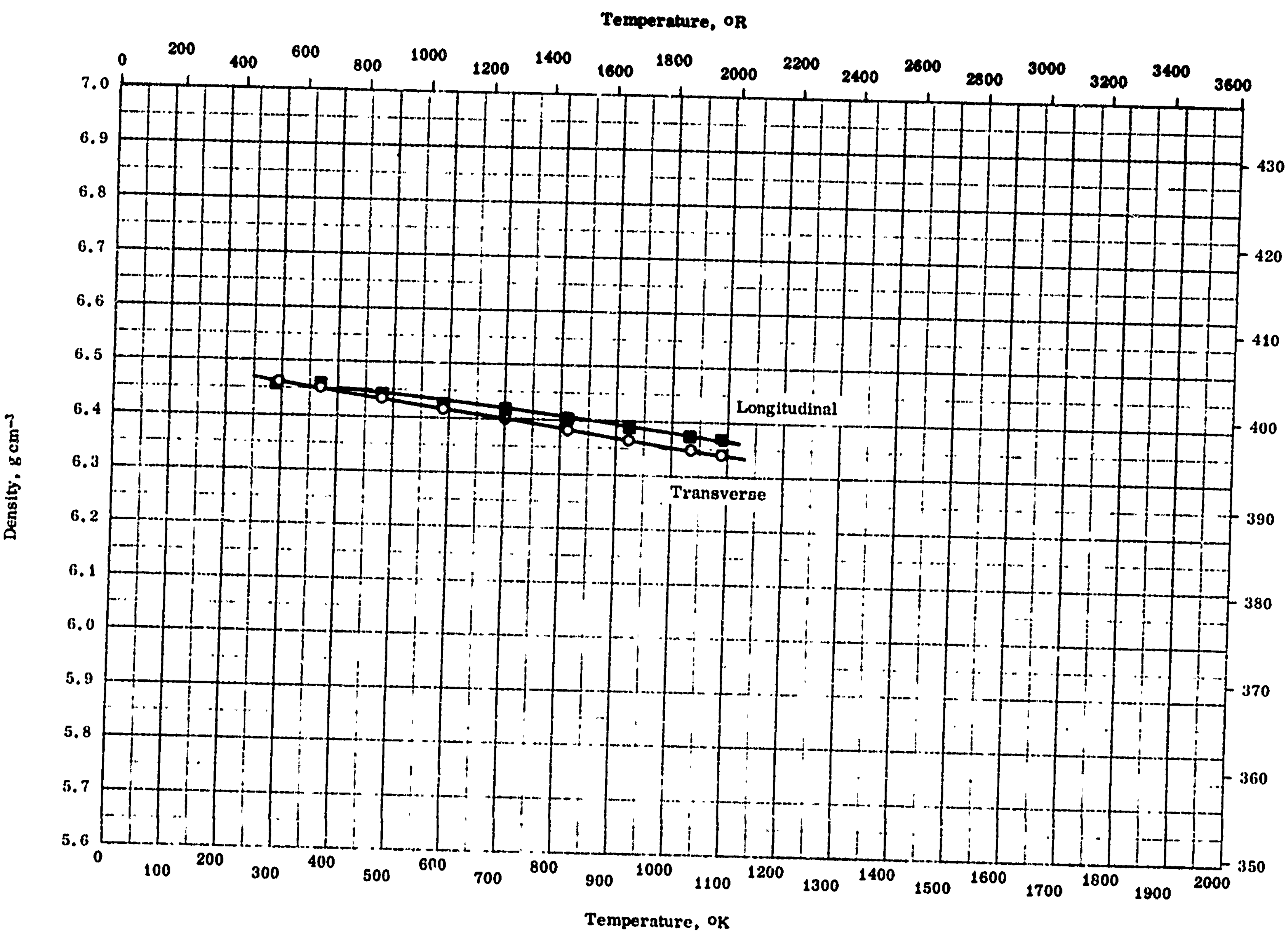


THERMAL DIFFUSIVITY -- YTTRIUM + ΣXi

THERMAL DIFFUSIVITY -- YTTRIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	60-2	390-1145	< 11	99.34 Y, 0.5>O, 0.1<Ca, 0.05 Mg, and traces of Al, Cu, B, Fe, Mn, Si, and Zr.	

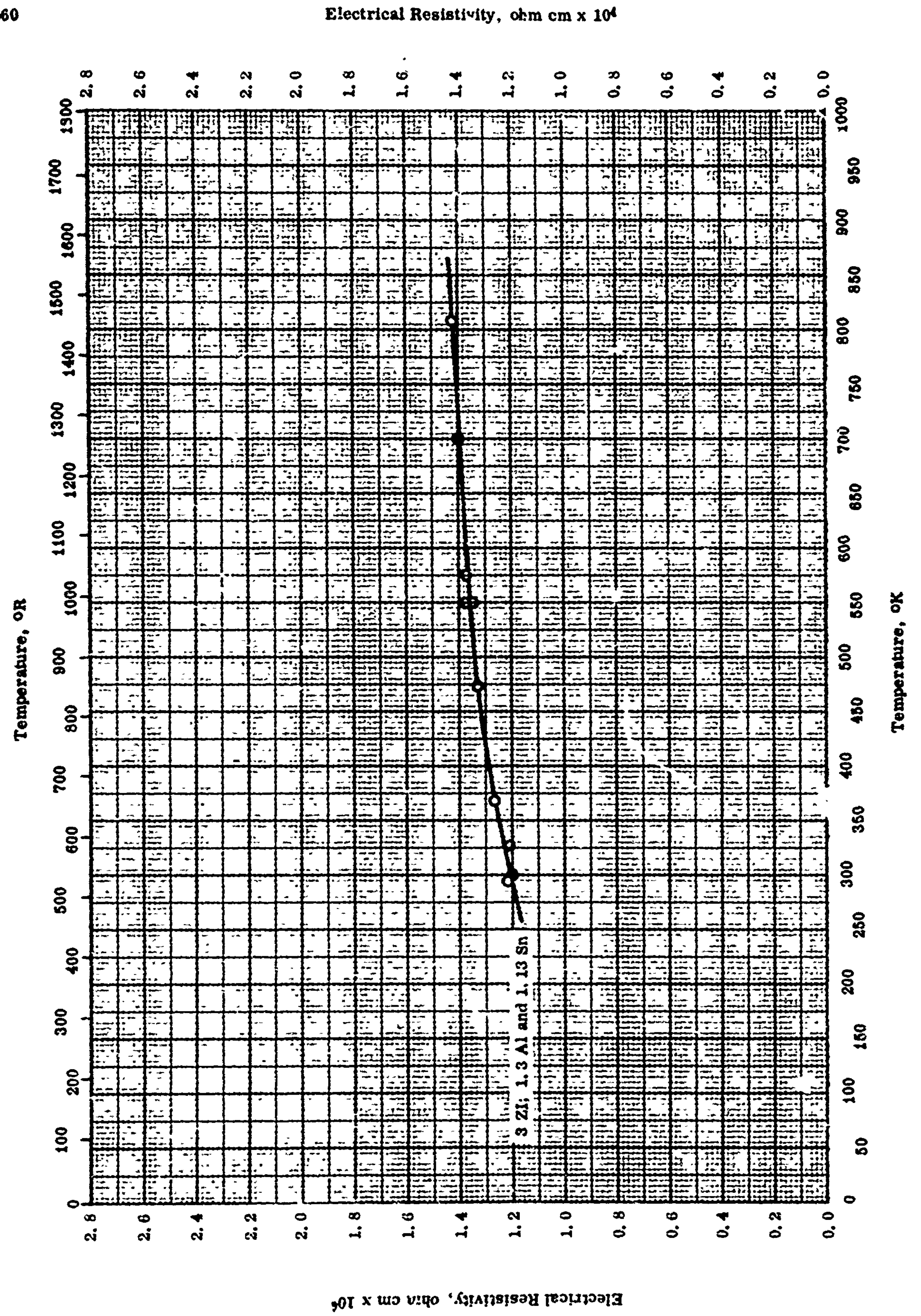


DENSITY -- ZIRCONIUM + ALUMINUM + ΣX_i

DENSITY -- ZIRCONIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	61-9	294-1089		Alloy 3 Zl ; 1.3 Al, 1.13 Sn, and 0.85 Mo.	Calculated from transverse thermal expansion.
■	61-9	294-1089		Same as above.	Calculated from longitudinal thermal expansion.

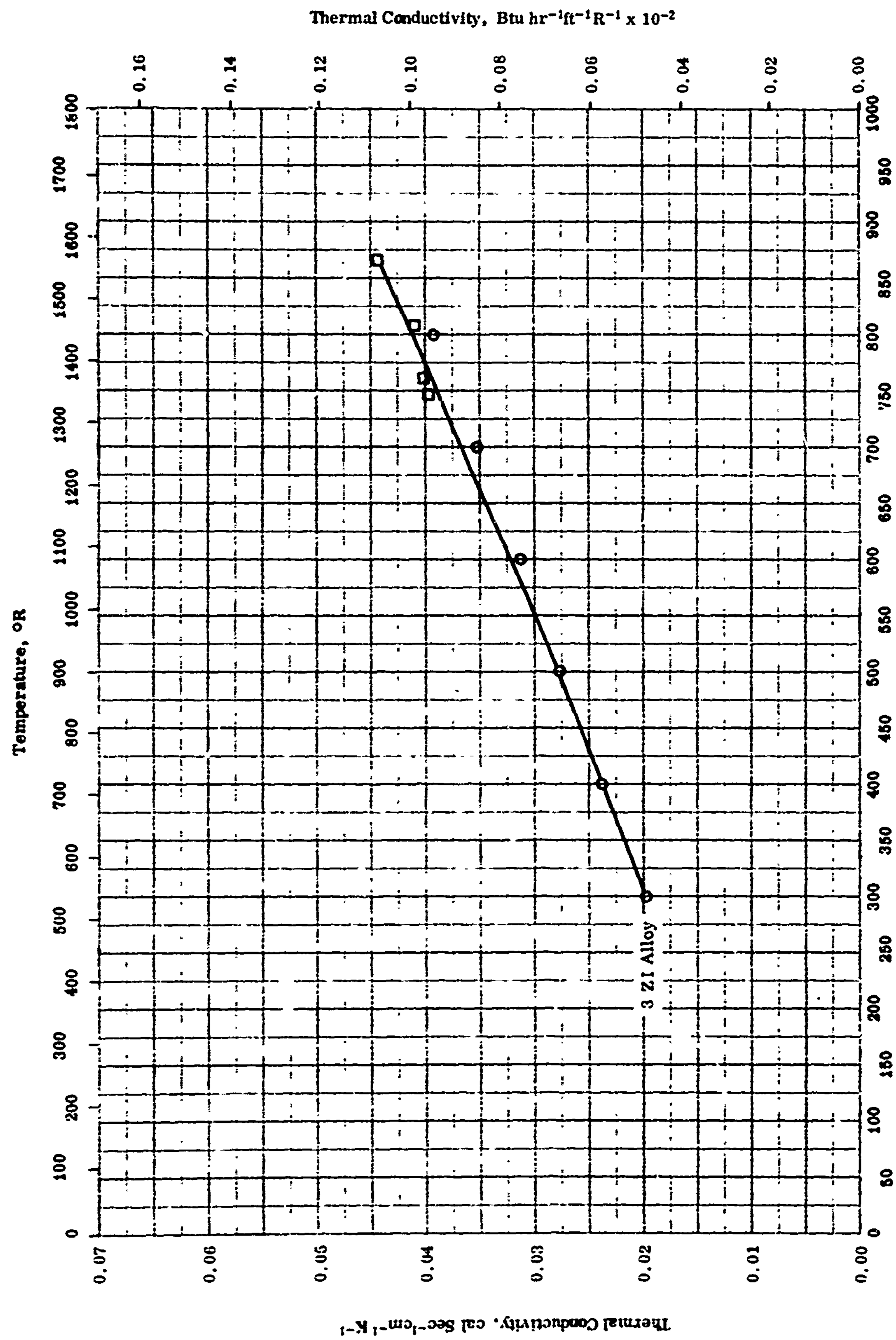


ELECTRICAL RESISTIVITY -- ZIRCONIUM + ALUMINUM + ΣX_i

ELECTRICAL RESISTIVITY -- ZIRCONIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

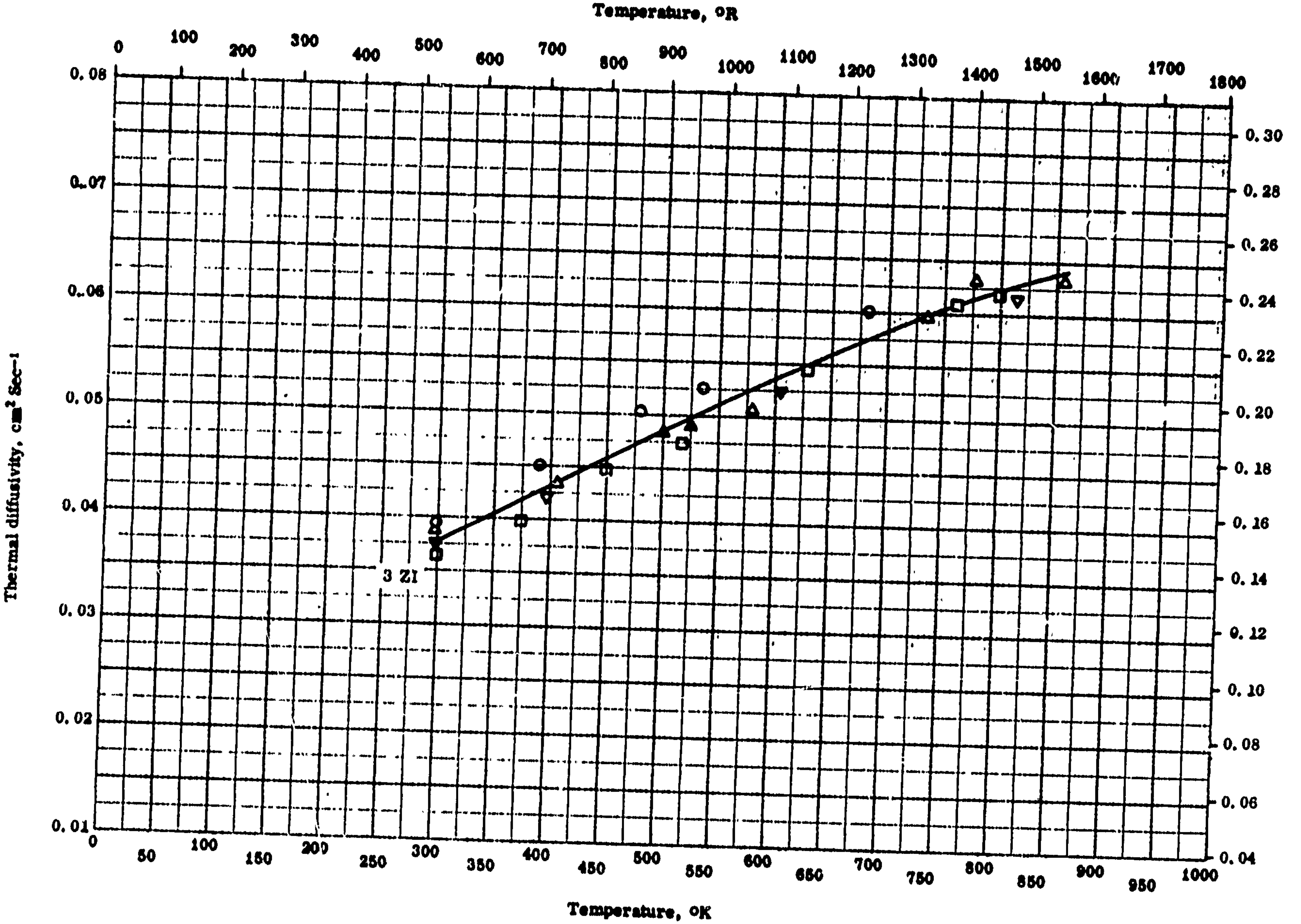
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-3	296-808		3 Zl; 1.30 Al, 1.13 Sn, and 0.85 Mo.	Average of four samples including their cooling curves.



THERMAL CONDUCTIVITY -- ZIRCONIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-3	300-800		3 Zl alloy; 1.3 Al, 1.13 Sn, and 0.85 Mo.	Calculated from electrical resistivity data.
□	61-9	747-866		Same as above.	

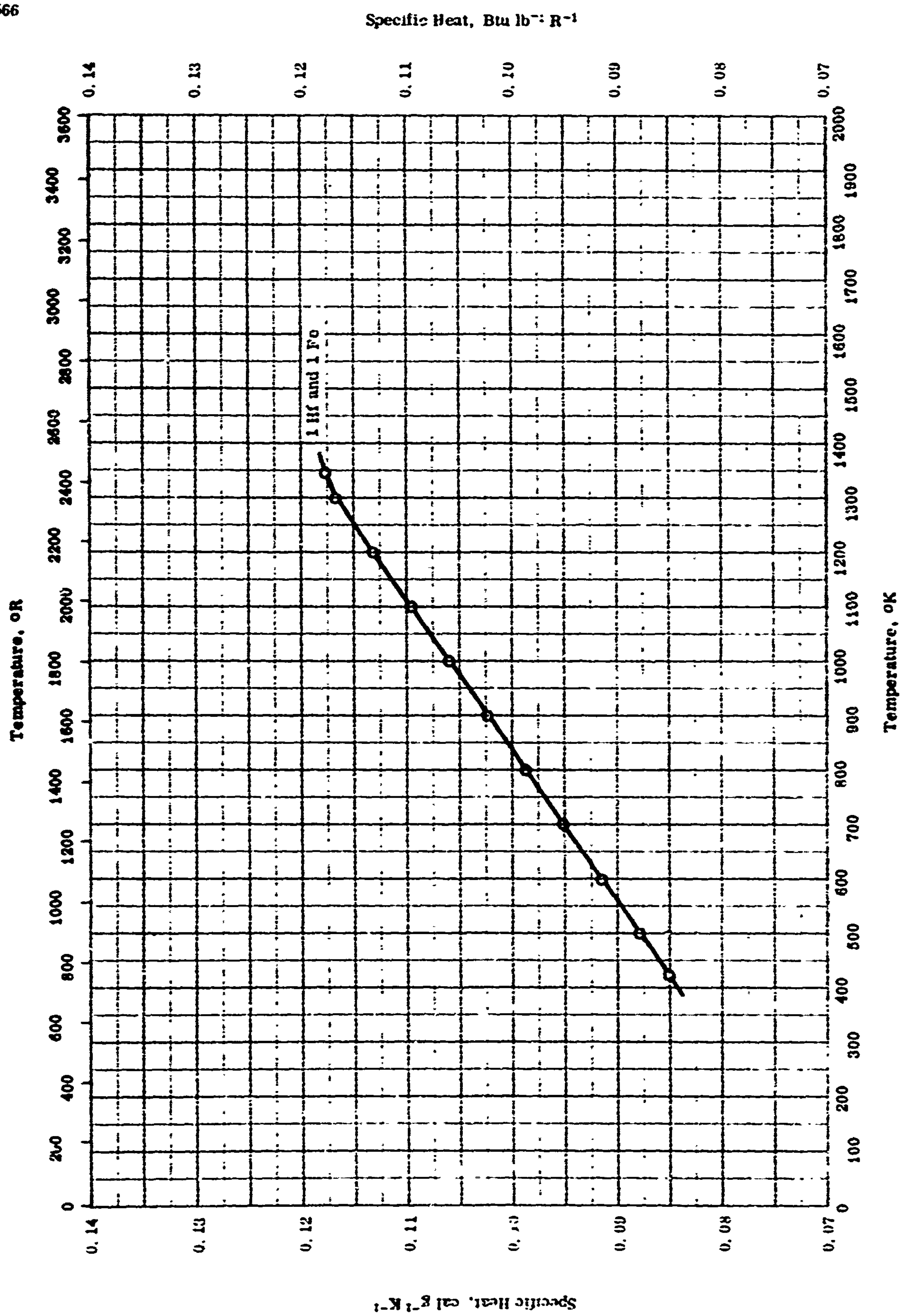


THERMAL DIFFUSIVITY -- ZIRCONIUM + ALUMINUM + ΣX_i

THERMAL DIFFUSIVITY — ZIRCONIUM + ALUMINUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	63-3	298-681	5	3 Zl; 1.3 Al, 1.13 Sn, and 0.85 Mo; apparent density 6.42 g cm^{-3}; [Author's design.: 3Zl-1].	
□	63-3	298-799	5	Same as above. [Author's design.: 3 Zl-2].	Another run.
△	63-3	298-857	5	Same as above. [Author's design.: 3 Zl-3].	Another run.
▽	63-3	298-815	5	Same as above. [Author's design.: 3 Zl-4].	Another run.

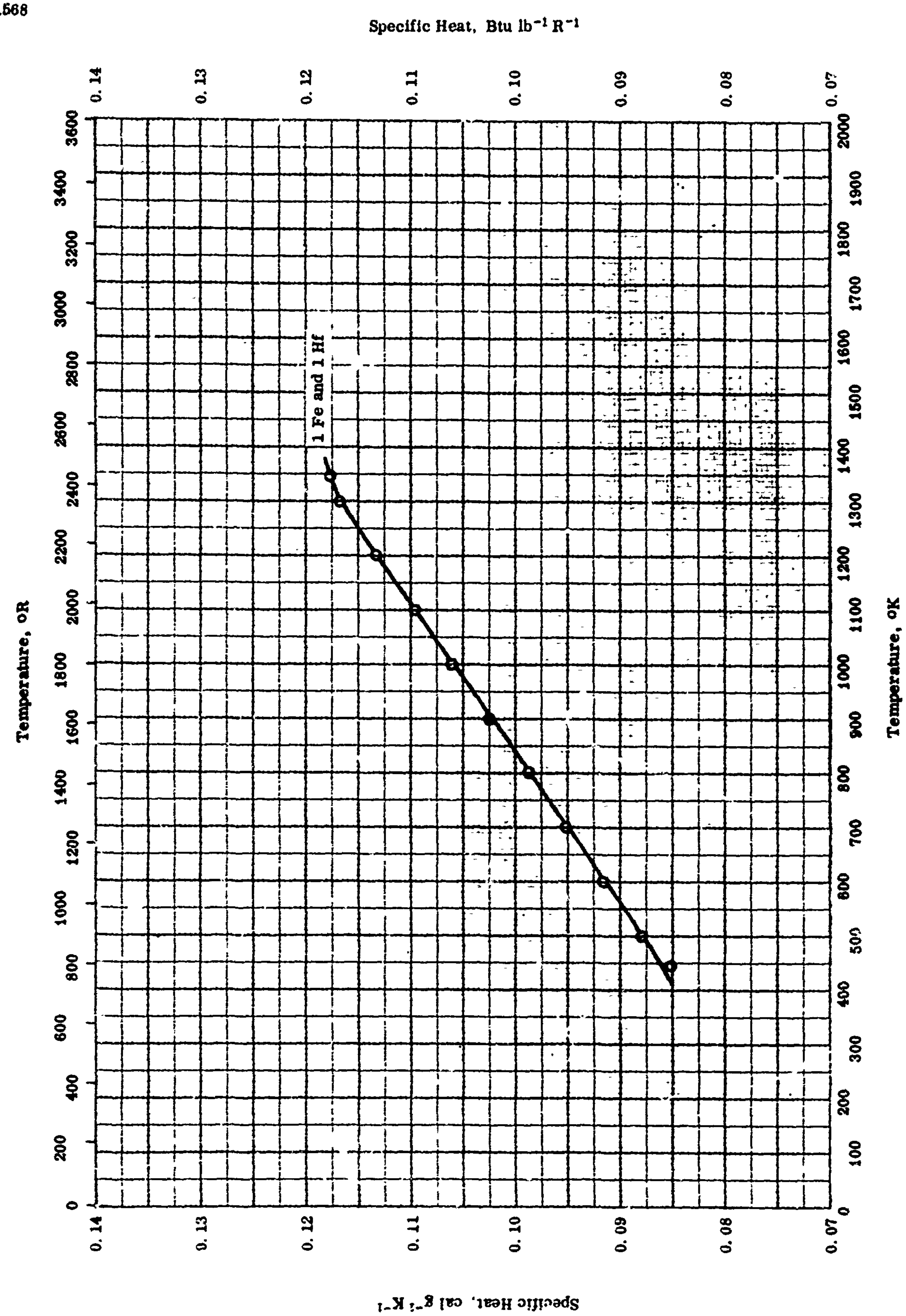


SPECIFIC HEAT -- ZIRCONIUM + HAFNIUM + ΣX_i

SPECIFIC HEAT -- ZIRCONIUM + HAFNIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	42-1	422-1270	± 5.0	1.0 Hf, 1.0 Fe, 0.04 Mg, < 0.04 Ba, < 0.04 Cd, 0.02 Cu, 0.02 Mn, 0.02 Ni, 0.01 Si, 0.004 Ca, 0.004 Ti, 0.002 Cr, 0.002 Pb, < 0.002 Sn, < 0.002 V, and < 0.0028 others.	

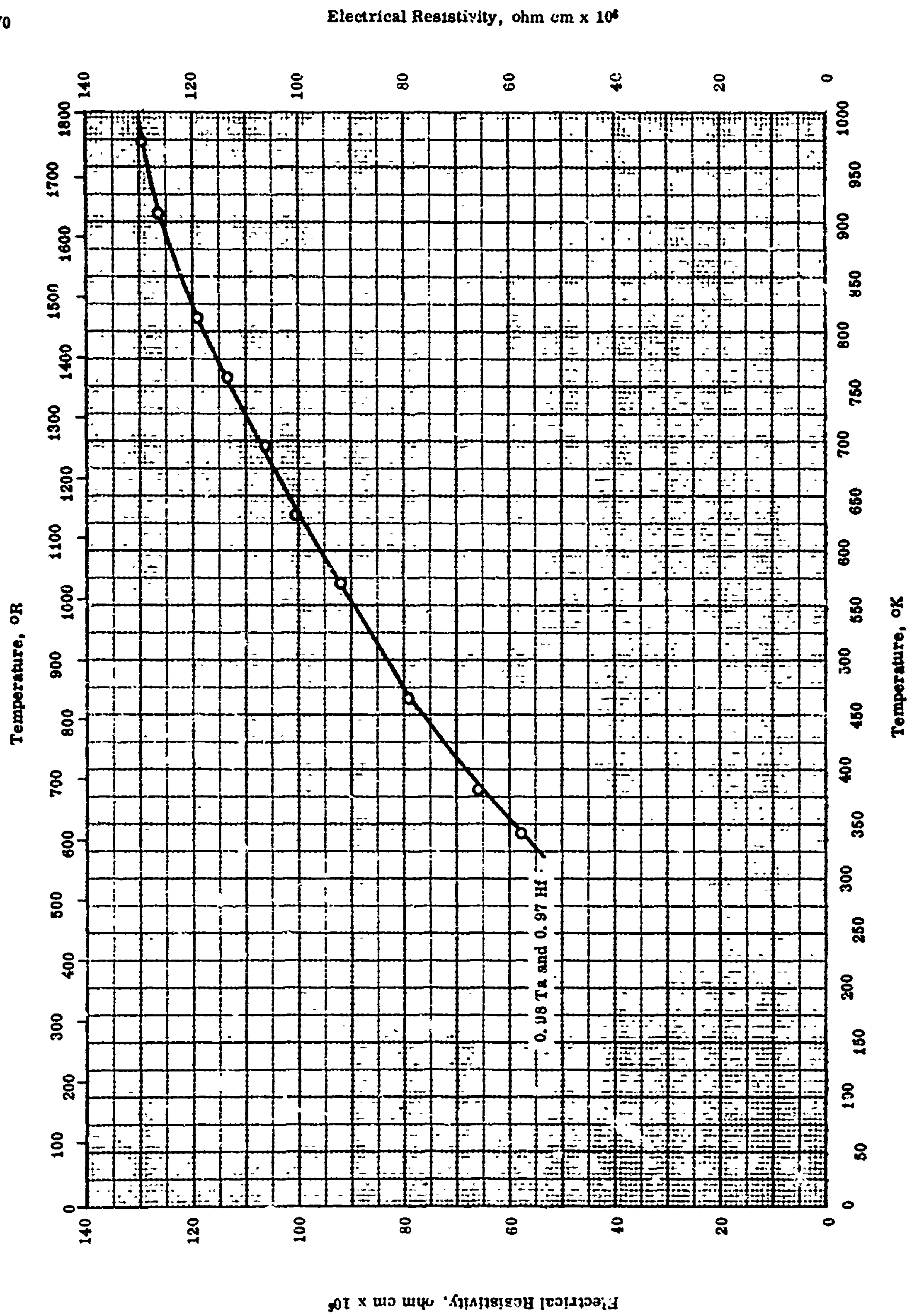


SPECIFIC HEAT -- ZIRCONIUM + IRON + ΣX_i

SPECIFIC HEAT -- ZIRCONIUM + IRON + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	42-1	422-1270	± 5.0	1.0 Fe, 1.0 Hf, 0.04 Mg, < 0.04 Ba, < 0.04 Cd, 0.02 Cu, 0.02 Mn, 0.02 Ni, 0.01 Si, 0.004 Ca, 0.004 Ti, 0.002 Cr, 0.002 Pb, < 0.002 Sn, < 0.002 V, and < 0.0028 others.	

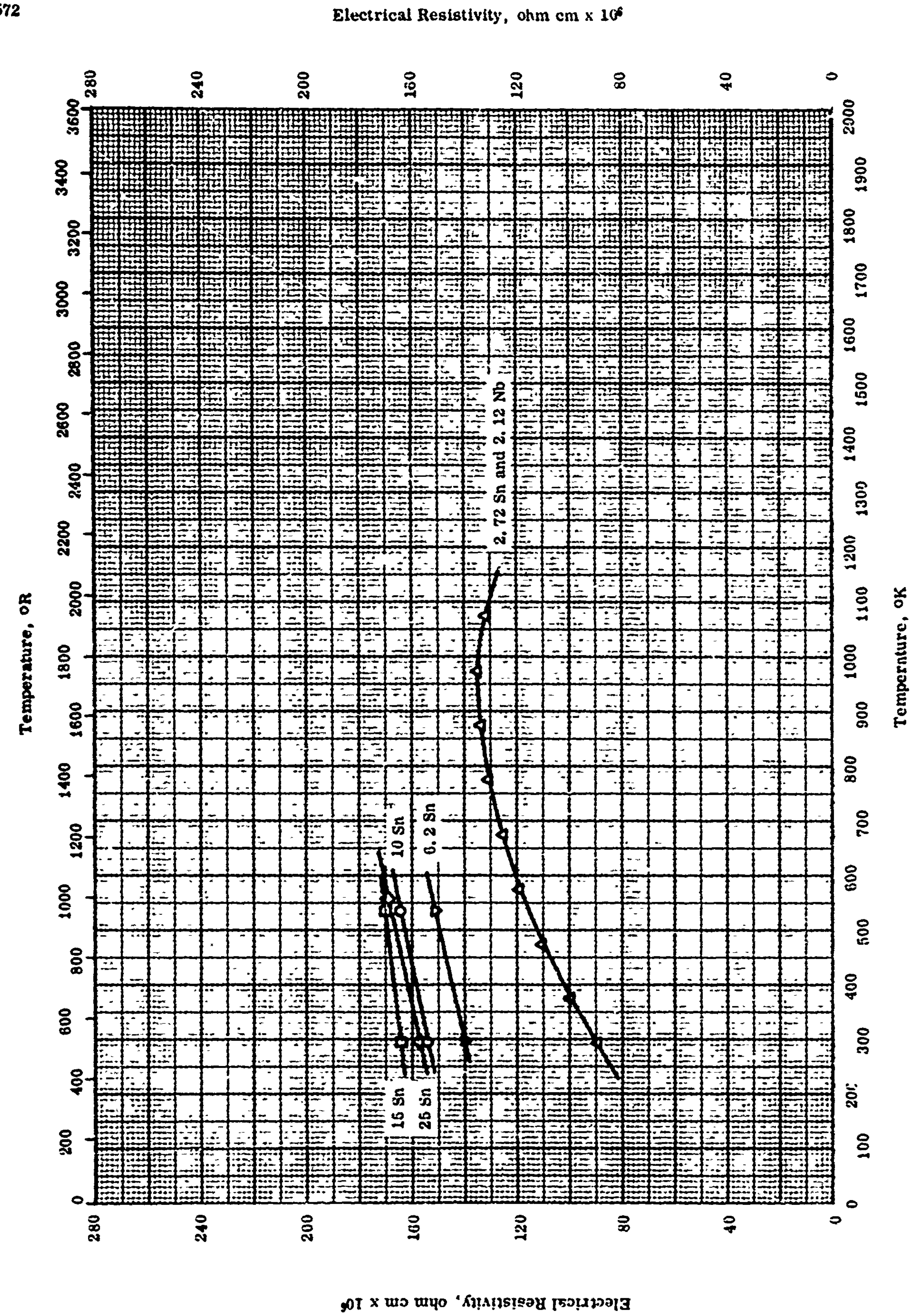


ELECTRICAL RESISTIVITY -- ZIRCONIUM + TANTALUM + ΣX_i

ELECTRICAL RESISTIVITY — ZIRCONIUM + TANTALUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
O	57-7	342-971		0.98 Ta, 0.97 Hf, and 0.03 C.	Annealed 48 hrs at 600 C in vacuum and water quenched.

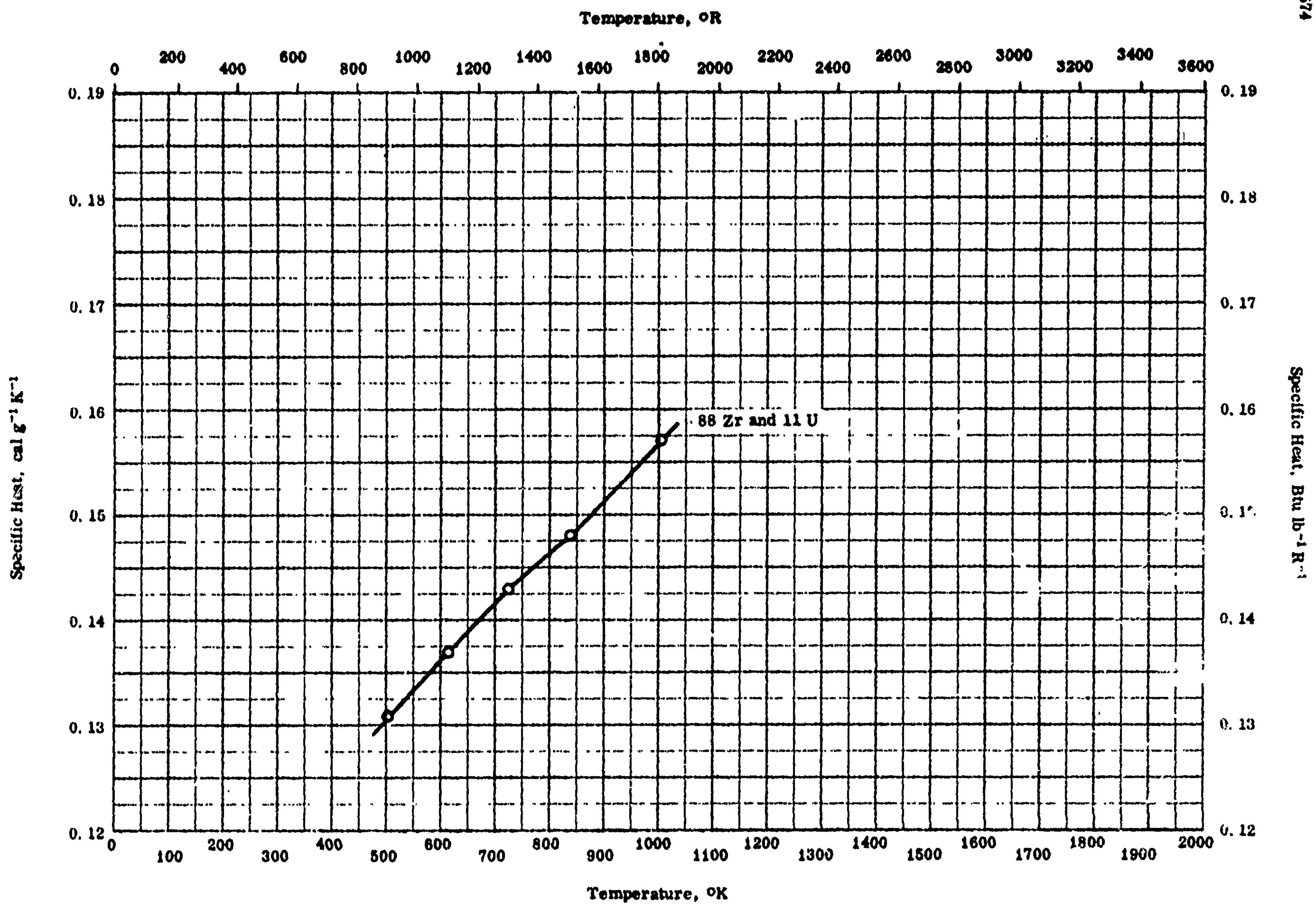


ELECTRICAL RESISTIVITY -- ZIRCONIUM + TIN + ΣX_i

ELECTRICAL RESISTIVITY -- ZIRCONIUM + TIN + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	51-7	298-533	± 1	10 Sn; actual: 8.94 Sn, 0.80 Hf, 0.34 C, 0.13 Fe, 0.035 Al, 0.026 N, and 0.004 Ti.	Induction melted; tested as cast.
□	51-7	298-533	± 1	15 Sn; actual: 10.8 Sn, 0.80 Hf, 0.35 C, 0.14 Fe, 0.03 Al, 0.027 N, and 0.004 Ti.	Same as above.
◇	51-7	298-533	± 1	25 Sn; actual: 24.6 Sn, 0.79 Hf, 0.30 C, 0.14 Fe, 0.035 Al, 0.029 N, and 0.004 Ti.	Same as above.
▽	51-7	298-533	± 1	6.20 Sn, 0.8 Hf, 0.37 C, 0.13 Fe, and 0.1 > total of N, Al, and Ti.	Same as above.
△	61-21	293-1073		2.72 Sn, 2.12 Nb, 0.071 Fe, and 0.006 Cr.	

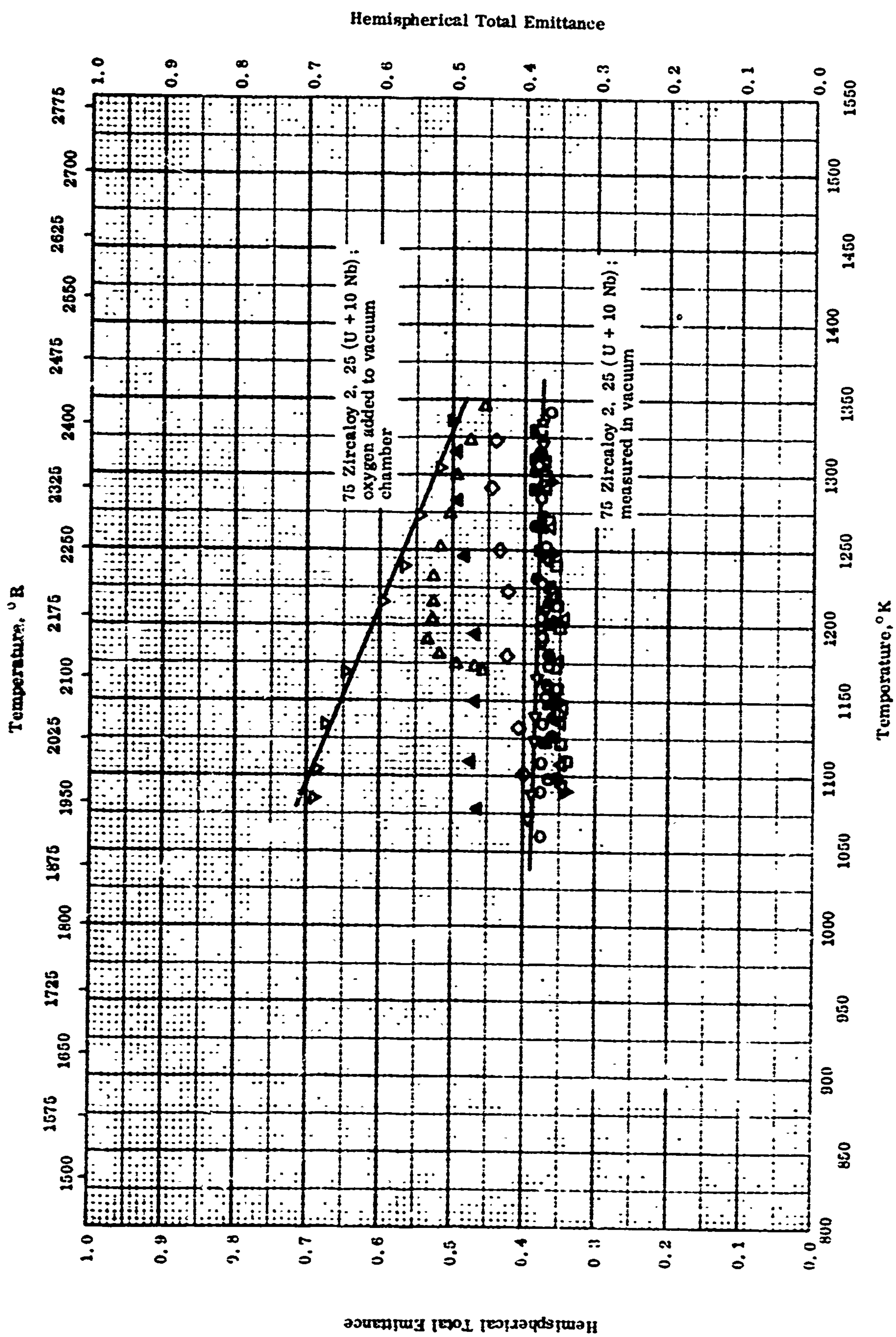


SPECIFIC HEAT -- ZIRCONIUM + URANIUM + ΣX_i

SPECIFIC HEAT -- ZIRCONIUM + URANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	63-12	477-1170	± 2.0	87.92 Zr, 10.58 U, and 1.5 H_2; density 383 lb ft^{-3}.	Hydrogen atmosphere.

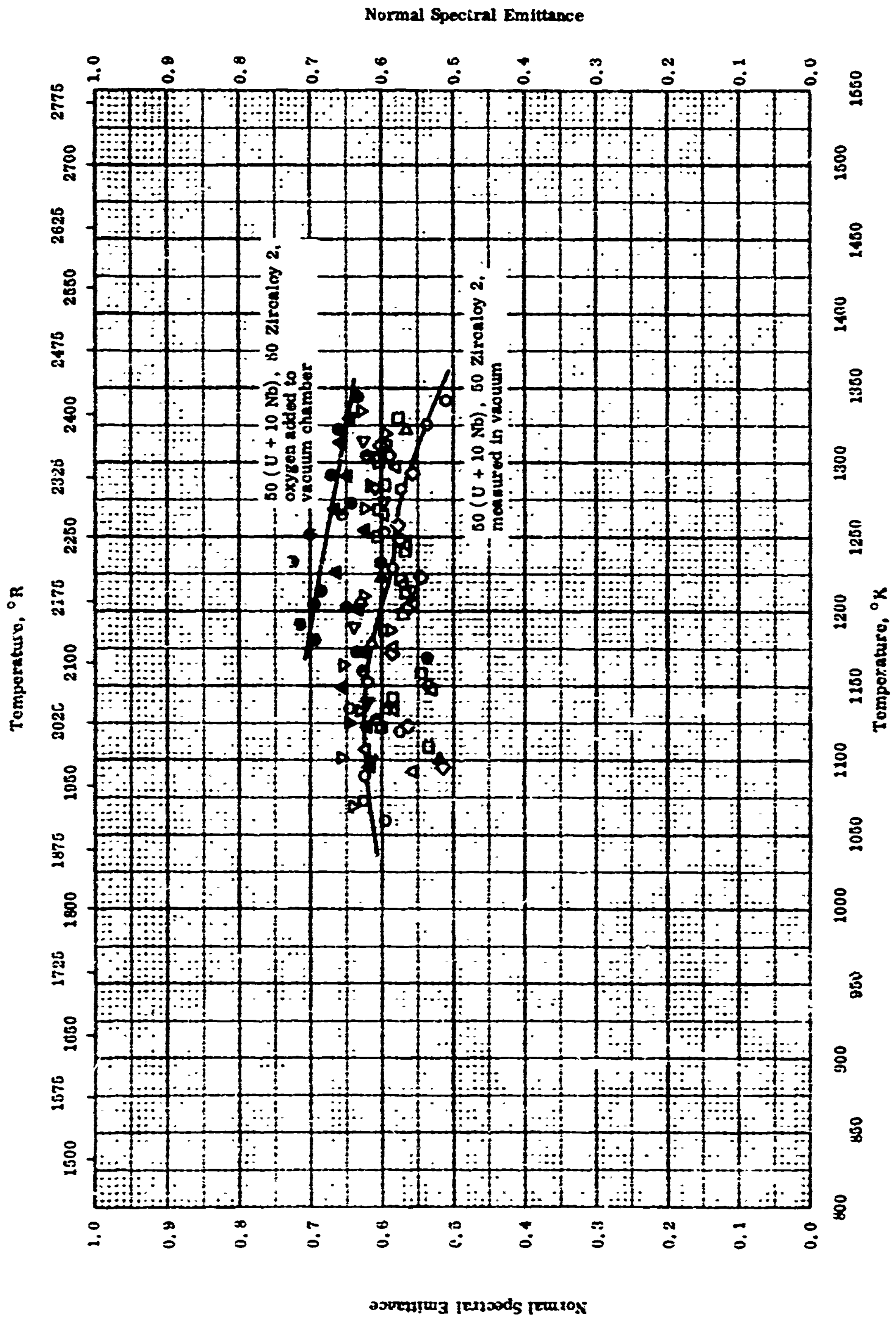


HEMISPHERICAL TOTAL EMITTANCE -- ZIRCONIUM + URANIUM + ΣX_i

HEMISPHERICAL TOTAL EMITTANCE -- ZIRCONIUM + URANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-49	1059-1342		50 Zircaloy 2 and 50 (U + 10 Nb); 49.1 Zr, 45 U, 5 Nb, 0.75 Sn, 0.075 Fe, 0.05 Cr, and 0.025 Ni.	Rolled at 815 C then annealed, quenched, and cold rolled; measured in vacuum; first heating.
△	57-49	1093-1308		Same as above.	The above specimen; first cooling.
□	57-49	1109-1330		Same as above.	The above specimen; second heating.
▼	57-49	1091-1311		Same as above.	The above specimen; second cooling.
▷	57-49	1169-1345		Same as above.	The above specimen; 20 charges (2.5 cm^3 at atmospheric pressure per charge) of oxygen added to vacuum chamber (chamber at 2 x 10^{-5} mm Hg and specimen at approximately 1173 K); first heating.
◇	57-49	1101-1323		Same as above.	The above specimen; first cooling.
◁	57-49	1071-1335		75 Zircaloy 2, 25 (U + 10 Nb); i.e. 73.672 Zr, 22.5 U, 2.5 Nb, 1.125 Sn, 0.075 Cr, 0.09 Fe, 0.038 Ni.	Rolled at 815 C then annealed, quenched, and cold rolled; measured in vacuum; first heating.
●	57-49	1099-1316		Same as above.	The above specimen; first cooling.
■	57-49	1123-1330		Same as above.	The above specimen; second heating.
◐	57-40	1097-1303		Same as above.	The above specimen; second cooling.
▽	57-49	1085-1336		Same as above.	The above specimen; oxygen added to vacuum chamber (chamber at 2 x 10^{-5} mm Hg); first heating.
▲	57-49	1078-1315		Same as above.	The above specimen; first cooling.



NORMAL SPECTRAL EMITTANCE -- ZIRCONIUM + URANIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Wavelength μ	Temp. Range, °K	Rept. Error %	Sample Specifications	Remarks
○	57-49	0.65	1059-1345		50 (U + 10 Nb) and 50 Zircaloy 2; 49.1 Zr, 45 U, 5 Nb, 0.75 Sn, 0.075 Fe, 0.05 Cr, and 0.025 Ni.	Rolled at 815 C then annealed, quenched, and cold rolled; measured in vacuum; first heating.
△	57-49	0.65	1093-1308		Same as above.	The above specimen; first cooling.
□	57-49	0.65	1100-1330		Same as above.	The above specimen; second heating.
◇	57-49	0.65	1091-1311		Same as above.	The above specimen; second cooling.
●	57-49	0.65	1100-1346		Same as above.	The above specimen; 20 charges (2.5 cm^3 at atmospheric pressure per charge) of oxygen added to vacuum chamber (chamber at 2 x 10^{-5} mm Hg and specimen at approximately 1173 K); first heating.
▷	57-49	0.65	1091-1322		Same as above.	The above specimen; first cooling.
▽	57-49	0.65	1071-1335		25 (U + 10 Nb) and 75 Zircaloy 2; 73.072 Zr, 22.5 U, 2.5 Nb, 1.125 Sn, 0.075 Cr, 0.09 Fe, and 0.038 Ni.	Rolled at 815 C then annealed, quenched, and cold rolled; measured in vacuum; first heating.
◁	57-49	0.65	1100-1316		Same as above.	The above specimen; first cooling.
▲	57-49	0.65	1096-1330		Same as above.	The above specimen; second heating.
◐	57-49	0.65	1096-1304		Same as above.	The above specimen; second cooling.

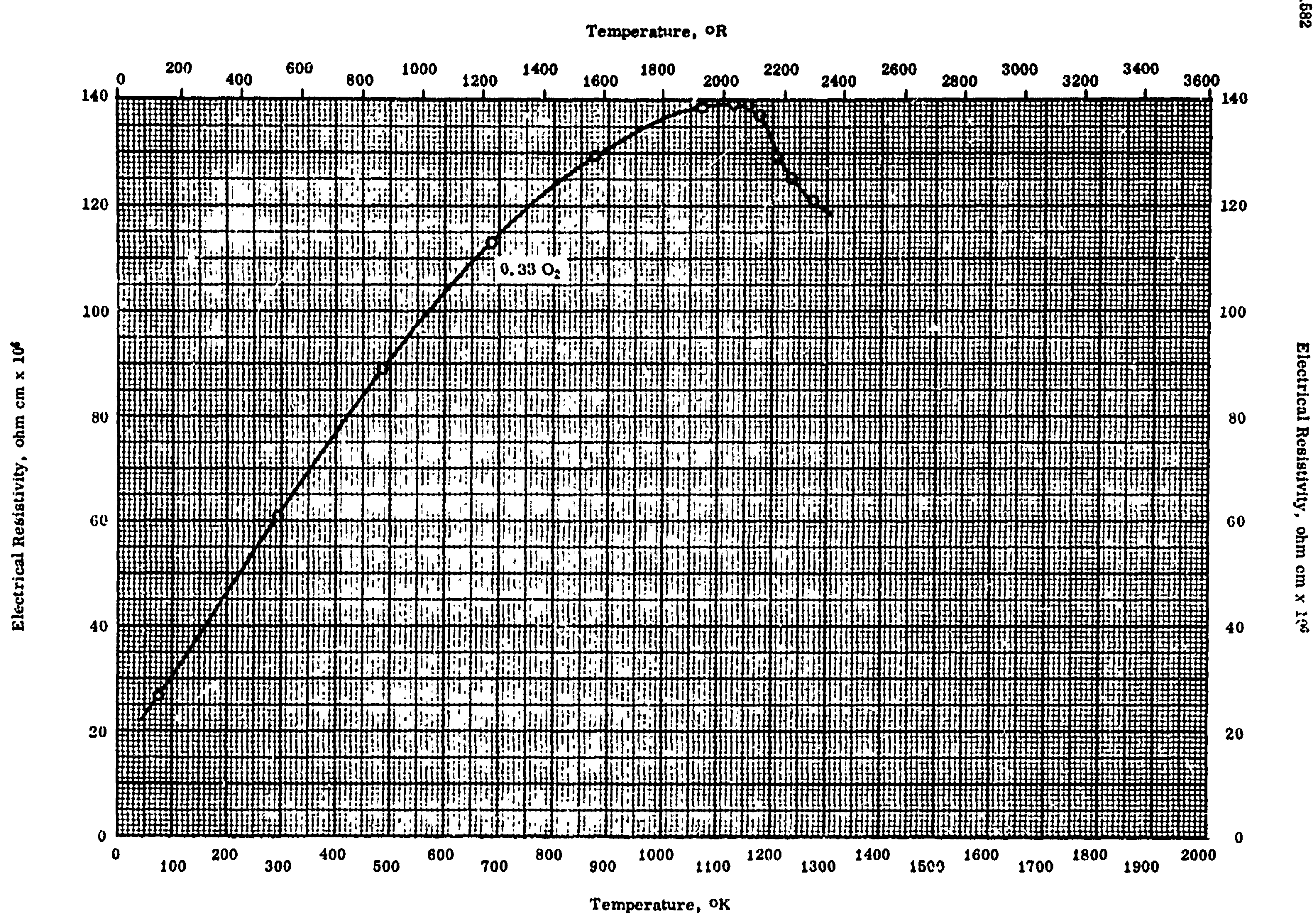
PROPERTIES OF ZIRCONIUM $+\Sigma X_i$

REPORTED VALUES

Density	g cm^{-3}	lb ft^{-3}
O 99^+ pure	6.499	405.7

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	50-15	300		99^+ pure.	Average density of 4 samples by weighting in air and distilled water.

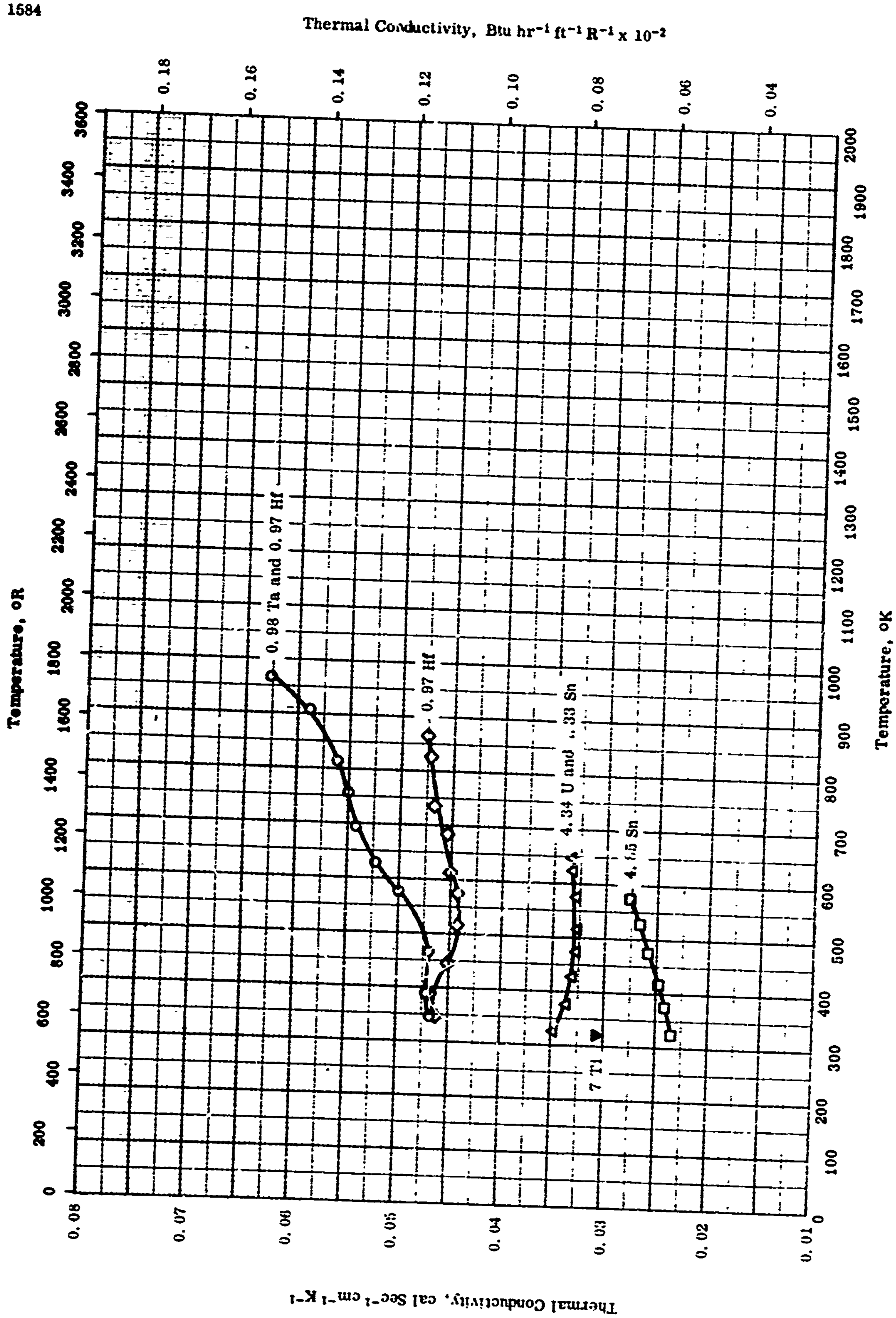


ELECTRICAL RESISTIVITY -- ZIRCONIUM + ΣX_i

ELECTRICAL RESISTIVITY -- ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

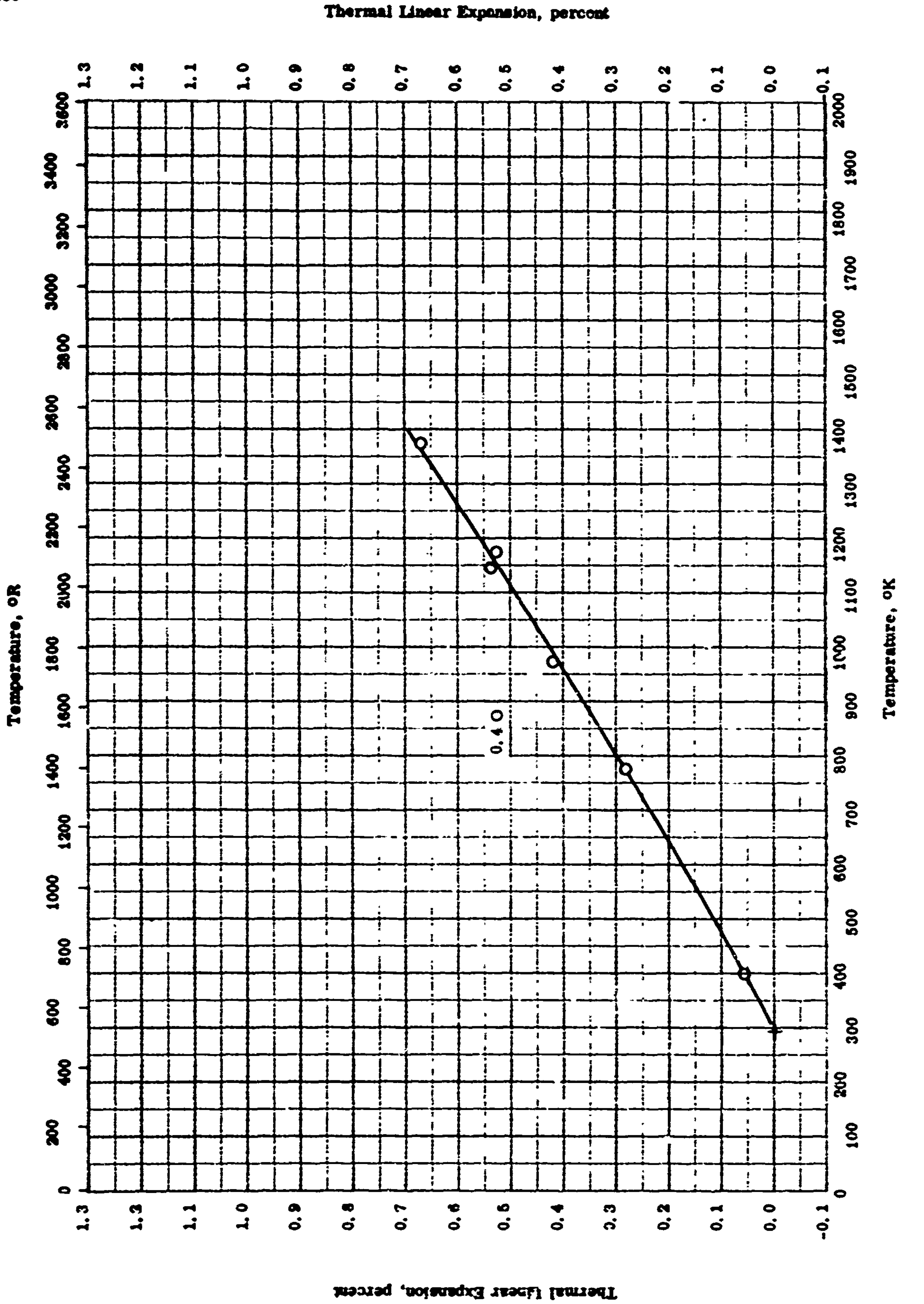
Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-26	73-1273		0.33 O_2, 0.051 Fe, 0.03 Hf, 0.02 each Al, Ca, C, and 0.01 W.	



THERMAL CONDUCTIVITY -- ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
○	57-7	343-972		0.98 Ta, 0.97 Hf, and 0.3 C.	Annealed 48 hrs at 600 C in vacuum; water quenched.
◇	57-7	339-364		0.97 Hf and 0.3 C.	Same as above.
▼	54-5	320		7 Ti.	
△	53-9	323-673		4.34 U, 1.33 Sn, 0.125 Fe, 0.09 Cr, 0.04 B, 0.027 Ni, and 0.013 N_2.	In Argon atm.
□	51-7	323-573	± 3	4.85 Sn, 0.23 Fe, 0.12 C, 0.024 Hf, 0.014 Ti, 0.009 Al, 0.007 N, and 0.006 Ni.	Prepared from loro Hf crystal bar; double arc-melted and forged at 1650 F.



THERMAL LINEAR EXPANSION -- ZIRCONIUM + ΣX_1

THERMAL LINEAR EXPANSION -- ZIRCONIUM + ΣX_i

REFERENCE INFORMATION

Symbol	Ref.	Temp. Range °K	Rept. Error %	Sample Specifications	Remarks
o	52-22	298-1373		0.4 O, < 0.05 Hf, and 0.02 N.	Sintered bar.

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MATERIAL INDEX

MATERIAL INDEX

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
A																
Acrylics	6-II	1020	1020	-	-	-	-	1022	1024	-	1626	-	-	-	-	-
Actinium (Ac)	1	3	3	3	3	-	-	-	-	-	-	-	-	-	-	5
Aggregates	5	-	-	-	-	-	-	1023	1025	-	-	-	-	-	-	-
AISI 201	3	-	-	-	-	-	-	-	-	-	114	-	-	-	-	-
AISI 202	3	-	-	-	-	-	-	-	-	52	-	-	-	-	-	-
AISI 301	3	145	140	-	-	-	-	159	172	182	203	-	243	274	-	-
AISI 302	3	-	140	-	-	-	-	-	166	186	227	-	236	-	-	-
AISI 302B	3	140	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 303	3	-	140	-	-	-	151	-	176	-	-	-	236, 245	-	-	-
AISI 304	3	145	140	-	-	-	151	161	-	180	213	-	257, 262	286	-	-
AISI 304L	3	145	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 305	3	-	140	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 308	3	-	140	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 309	3	-	140	-	-	-	-	-	-	183	-	-	-	286	-	-
AISI 310	3	140	141	-	-	-	153	164	180	-	213	-	233	286	-	-
AISI 310 coated with Hastelloy C	6-II	-	-	-	-	-	-	-	-	-	-	-	1337	-	-	-
AISI 310 coated with Hastelloy X	6-II	-	-	-	-	-	-	-	-	-	-	-	1330	-	-	-
AISI 310 coated with Kennametal K-151A	6-II	-	-	-	-	-	-	-	-	-	-	-	1401	-	-	-
AISI 310 coated with Kennametal K-162B	6-II	-	-	-	-	-	-	-	-	-	-	-	1433	-	-	-
AISI 310 coated with spinel enamel	6-II	-	-	-	-	-	-	-	-	-	-	-	1515	-	-	-
AISI 310 coated with strontium titanate	6-II	-	-	-	-	-	-	-	-	-	-	-	1393	-	-	-
AISI 314	3	-	-	-	-	-	-	-	-	-	223	-	-	-	-	-
AISI 316	3	140, 145	141	-	-	-	149	161	174	184	209	229	236, 247, 250, 264	276	-	-
AISI 317	3	-	141	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 321	3	140, 145	-	-	-	-	-	-	-	186	205	227	236, 249, 253, 266	278	-	-
AISI 321 coated with rinsed-Mason black enamel	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1513	-	-
AISI 321 plated with silver . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1321	-	-
AISI 330	3	-	-	-	-	-	-	-	-	-	213, 407	-	-	-	-	-
AISI 347	3	-	141	-	-	-	149	161	176	186	203	-	251	-	-	-
AISI 403	3	-	53	-	-	-	-	-	79	87	110	-	-	-	-	-
AISI 405	3	-	53	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
AISI 410	3	55	53	-	-	-	-	-	-	87	119	120	122	136	-	-
AISI 414	3	-	-	-	-	-	-	-	-	-	197	-	-	-	-	-
AISI 416	3	-	53	-	-	-	-	-	109	87	119	-	-	-	-	-
AISI 420	3	-	-	-	-	-	-	73	166	97	119, 195	-	-	138	-	-
AISI 422	3	-	-	-	-	-	-	-	-	-	194	-	-	-	-	-
AISI 430	3	-	53	-	-	-	-	73	79	90	-	-	-	138	-	-
AISI 430F	3	-	53	-	-	-	-	-	-	-	-	-	-	-	-	-
AISI 431	3	-	-	-	-	-	-	-	-	-	197	-	-	256	-	-
AISI 440A	3	-	53	-	-	-	-	-	-	-	112	-	-	-	-	-
AISI 440B	3	-	53	-	-	-	-	-	-	-	112	-	-	-	-	-
AISI 440C	3	-	53	-	-	-	-	-	61	-	112	-	-	-	-	-
AISI 446	3	55	53	-	-	-	59	67, 73	79	94	98	120	124, 131	138	-	-
AISI 446 coated with aluminum oxide coating	6-II	-	-	-	-	-	-	-	-	-	-	-	1349	-	-	-
AISI 446 coated with Rokide A coating	6-II	-	-	-	-	-	-	-	-	-	-	-	1351	-	-	-
AISI 611	3	-	-	-	-	-	-	-	-	-	452	-	-	-	-	-
AISI 612	3	-	-	-	-	-	-	-	-	-	353	-	-	-	-	-
AISI 613	3	-	-	-	-	-	-	-	-	-	353	-	-	-	-	-
AISI 650	3	-	-	-	-	-	-	-	-	-	401	-	-	-	-	-
AISI 660	3	-	-	-	-	-	-	-	-	-	401	-	-	-	-	-
AISI 661	3	-	-	-	-	-	-	-	-	-	219	-	-	-	-	-
AISI 662	3	-	-	-	-	-	-	-	-	-	401	-	-	-	-	-
AISI 663	3	-	-	-	-	-	-	-	-	-	401	-	-	-	-	-
AISI 664	2-II	-	-	-	-	-	-	-	-	-	1265	-	-	-	-	-
AISI 665	3	-	-	-	-	-	-	-	-	-	401	-	-	-	-	-
AISI 681	2-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
AISI 682	2-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
AISI 690	2-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
AISI C1006	3	-	-	-	-	-	-	-	-	329	-	-	-	-	-	-
AISI C1010	3	-	310	-	-	-	312	316	325	329	335	-	-	-	-	-
AISI C1015	3	-	-	-	-	-	-	-	-	333	-	-	-	-	-	-
AISI C1020	3	-	-	-	-	-	-	-	-	329	-	345-347	-	-	-	-
AISI C1045	3	-	-	-	-	-	-	-	-	333	-	-	-	-	-	-
AISI 3140	3	-	-	-	-	-	-	-	-	365	-	-	-	-	-	-
AISI 4130	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
AISI 4340	3	-	-	-	-	-	-	-	397	395	-	-	-	-	-	-
AISI 8630	3	-	-	-	-	-	-	-	-	-	337	-	-	-	-	-
Akermanite	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
Alathon-10	6-II	1030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alberit 1005	6-II	-	-	-	-	-	1952	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Alberit 5392-60	6-II	-	-	-	-	-	1032	-	-	-	-	-	-	-	-	-
Alcoa	1	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-
Alkali and alkaline earth aluminum borosilicate glass	4-II	-	-	-	-	-	-	-	-	-	1715	-	-	-	-	-
Alkyd-isocyanate foam	6-II	952	-	-	-	-	-	954	956	-	958	-	-	-	-	-
Alumina	4-I	3	3	-	-	3	5	8	11-13	20	22-26	-	28-32	34	37	39
Alumina + Mullite	4-II	-	-	-	-	-	-	-	1534	-	-	-	-	-	-	-
Aluminide coating on niobium	6-II	-	-	-	-	-	-	-	-	-	-	-	1435-1437	1439	-	-
Aluminide coating on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1441-1443	1445	-	-
Aluminide coating on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	1447-1449	1451	-	-
Aluminized-silicone paint on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1497	-	-
Aluminum (Al)	1	7	7	7	7	7	9	11	13	15	17	-	15-23	25	28	36
Aluminum clad boron carbide	5	979	-	-	-	-	-	981	-	-	-	-	-	-	-	-
Aluminum coated with silicon (di-)oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1361	-	-
Aluminum coated with silicon (mon-)oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1369	-	-
Aluminum coating on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1357	-	-
Aluminum, Kaiser	1	-	-	-	-	-	-	-	-	-	-	-	19	-	-	-
Aluminum + ΣX_i	2-II	-	-	-	-	-	-	-	829	831	-	-	-	-	-	-
Aluminum + Beryllium	2-I	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-
Aluminum + Beryllium + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	729	-	-	-	-	-
Aluminum + Copper	2-I	-	-	-	-	-	5	7	9	-	11	-	-	-	-	-
Aluminum + Copper + ΣX_i	2-II	731	731	731	-	-	733	735	737-739	741	743-752	-	754-757	759	-	-
Aluminum + Iron	2-I	-	-	-	-	-	-	-	23	-	-	-	-	-	-	-
Aluminum + Magnesium	2-I	-	-	-	-	-	15	-	17	-	-	-	-	-	-	-
Aluminum + Magnesium + ΣX_i	2-II	763	763	-	-	-	765	-	767	-	769	-	771	773	-	-
Aluminum + Manganese	2-I	-	-	-	-	-	-	-	-	-	-	-	19-21	-	-	-
Aluminum + Nickel + ΣX_i	2-II	-	-	-	-	-	775	-	777	-	781	-	-	-	-	-
Aluminum + Silicon	2-I	-	-	-	-	-	-	-	-	-	23	-	-	-	-	-
Aluminum + Silicon + ΣX_i	2-II	-	-	-	-	-	783-785	-	787-794	-	796-804	-	-	-	-	-
Aluminum + Silver	2-I	25, 431	-	-	-	25	27	29	-	-	-	-	-	-	-	-
Aluminum + Uranium	2-I	-	-	-	-	-	-	-	31	-	34	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Aluminum + Zinc + ΣX_i	2-II	806	806	806	-	-	808	810	812	814	816	-	818-823	825	-	-
Aluminum alloys (Special designations)																
2S	2-II	-	-	-	-	-	-	-	829	831	-	-	-	-	-	-
14S	2-II	-	-	-	-	-	-	-	739	-	-	-	-	-	-	-
17S	2-II	-	-	-	-	-	-	-	-	-	743	-	-	-	-	-
24S	2-II	731	-	-	-	-	-	735	737	741	745	-	754-757	759	-	-
75S	2-II	806	-	-	-	-	-	810	812	814	816	-	818-823	825	-	-
1075	1	-	-	-	-	-	-	-	-	-	-	-	-	25	-	-
1100	2-II	-	-	-	-	-	-	-	-	831	-	-	-	-	-	-
2024	2-II	731	-	-	-	-	-	735	737	741	745	-	754-757	759	-	-
2219	2-II	-	-	-	-	-	-	-	-	-	-	-	-	759	-	-
3003	2-I	-	-	-	-	-	-	-	-	-	-	-	19-21		-	-
6061	2-II	-	-	-	-	-	-	-	-	-	-	-	771	773	-	-
7075	2-II	806	-	-	-	-	-	810	812	814	816	-	818-823	825	-	-
Alpax Gamma	2-II	-	-	-	-	-	785	-	794	-	802	-	-	-	-	-
C-46	2-II	731	731	731	-	-	-	-	-	-	747	-	-	-	-	-
Duralite	2-II	731	731	731	-	-	-	-	739	-	743	-	-	-	-	-
Gamma, γ	2-II	-	-	-	-	-	-	-	-	-	747	-	-	-	-	-
Hydronalium 5	2-I	-	-	-	-	-	15	-	17	-	-	-	-	-	-	-
Hydronalium 7	2-II	-	-	-	-	-	765	-	767	-	-	-	-	-	-	-
Hydronalium 51	2-II	-	-	-	-	-	765	-	767	-	-	-	-	-	-	-
L'A-Z5G	2-II	306	806	806	-	-	808	810	812	-	816	-	-	-	-	-
Lo-Ex	2-II	-	-	-	-	-	785	-	794	-	798	-	-	-	-	-
RAE 40C	2-II	-	-	-	-	-	775	-	778	-	781	-	-	-	-	-
RAE 47B	2-II	-	-	-	-	-	775	-	778	-	781	-	-	-	-	-
RAE 47D	2-II	-	-	-	-	-	775	-	778	-	-	-	-	-	-	-
RAE 55	2-II	-	-	-	-	-	775	-	778	-	781	-	-	-	-	-
RAE 470	2-II	-	-	-	-	-	-	-	-	-	781	-	-	-	-	-
RAE SA1	2-II	-	-	-	-	-	785	-	792	-	798	-	-	-	-	-
RAE SA44	2-II	-	-	-	-	-	785	-	792	-	798	-	-	-	-	-
RR50	2-II	-	-	-	-	-	783	-	-	-	796	-	-	-	-	-
RR50C	2-II	-	-	-	-	-	-	-	788	-	-	-	-	-	-	-
RR53C	2-II	-	-	-	-	-	783	-	788	-	796	-	-	-	-	-
RR59	2-II	-	-	-	-	-	733	-	739	-	745	-	-	-	-	-
RR77	2-II	-	-	-	-	-	808	-	812	-	816	-	-	-	-	-
RR131D	2-II	-	-	-	-	-	765	-	767	-	769	-	-	-	-	-
Thermalond C3-INA	2-II	731	731	731	-	-	-	-	739	-	743	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Aluminum alloys (Special designations) (cont.)																
Y	2-II	-	-	-	-	-	733	-	739	-	-	-	-	-	-	-
Aluminum antimonide (AlSb) . .	6-I	-	-	-	-	-	45	47	-	-	49	-	-	-	-	-
Aluminum borate ($2Al_2O_3 \cdot B_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1035
Aluminum borides																
AlB_{10}	6-I	-	160	-	-	-	-	-	-	-	-	-	-	-	-	-
AlB_{12}	6-I	-	160	-	-	-	162	-	-	-	-	-	-	-	-	-
Aluminum bubbles - graphite fibers composite system . . .	6-II	-	-	-	-	-	-	-	1279	-	-	-	-	-	-	-
Aluminum carbide (Al_4C_3) . . .	5	-	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum carbide + Aluminum oxide	5	-	-	-	-	-	-	803	-	-	-	-	-	-	-	-
Aluminum-chromium-molybdenum cermets.	6-II	930	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum fluoride (AlF_3) . . .	5	407	407	-	-	407	-	-	-	-	-	-	-	-	-	-
Aluminum-nickel-titanium cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum niobate ($Al_2O_3 \cdot Nb_2O_5$)	4-II	-	1121	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum nitride (AlN)	5	481	481	-	-	-	-	483	485	-	487	-	489-491	493	-	-
Aluminum oxides																
Aluminum oxide (Al_2O_3) . . .	4-I	3	3	-	-	3	5	8	11-18	20	22-26	-	28-32	34	37	39
38-900	4-I	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-
AD-85	4-I	-	-	-	-	-	-	-	-	-	-	-	637	-	639	-
AD-94	4-I	-	-	-	-	-	-	-	-	-	-	-	637	-	639	-
AD-96	4-I	-	-	-	-	-	-	-	-	-	-	-	32	-	37	-
AD-99	4-I	-	-	-	-	-	-	-	-	-	-	-	32	-	37	-
AD-995	4-I	-	-	-	-	-	-	-	-	20	-	-	32	-	-	-
AP-30	4-I	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-
AP-35	4-I	-	-	-	-	-	-	-	-	20	-	-	32	-	37	-
AV-30	4-I	-	-	-	-	-	-	-	-	-	-	-	32	-	37	-
FS-54	4-I	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-
GD-10	4-I	-	-	-	-	-	-	-	-	20	-	-	-	-	-	-
Gulton HSB	4-I	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-
LA-603	4-I	-	-	-	-	-	-	-	-	-	-	-	28-30	-	-	-
RA-4213	4-I	-	-	-	-	-	-	-	-	-	-	-	28-30	-	-	-
TWA 2, A402	4-I	-	-	-	-	-	-	-	-	-	-	-	32	-	-	-
Wesgo Al-300	4-I	-	-	-	-	-	-	-	14	-	-	-	-	-	-	-
Aluminum oxide foam	4-I	-	-	-	-	-	-	-	18	-	26	-	-	-	-	-
Aluminum oxide reinforced by molybdenum fibers.	6-II	-	-	-	-	-	-	-	1261	-	1263	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Aluminum oxide coating on AISI 446	6-II	-	-	-	-	-	-	-	-	-	-	-	1349	-	-	-
Aluminum oxide + ΣX_i	4-I	-	-	-	-	-	-	-	-	-	635	-	637	-	639	-
Aluminum oxide + Aluminum cermet	6-II	-	-	-	-	-	-	-	-	-	729	-	-	-	-	-
Aluminum oxide + Aluminum silicate	4-II	-	-	-	-	-	-	-	1534	-	-	-	-	-	-	-
Aluminum oxide + Beryllium oxide + Magnesium oxide . . .	4-I	-	-	-	-	-	-	-	-	-	599	-	-	-	-	-
Aluminum oxide + Chromium cermet	6-II	731	-	-	-	-	-	-	911	-	733	-	735	-	-	-
Aluminum oxide + Chromium (sesqui-) oxide	4-I	-	-	-	-	-	601	-	-	-	603	-	605	-	-	-
Aluminum oxide + Chromium + + Molybdenum cermet	6-II	737	-	-	-	-	-	-	-	-	739	-	-	-	-	-
Aluminum oxide + Iron cermet .	6-II	-	-	-	-	-	-	-	-	-	741	-	-	-	-	-
Aluminum oxide + Magnesium oxide + Beryllium oxide . . .	4-I	-	-	-	-	-	-	-	-	-	607	-	-	-	-	-
Aluminum oxide + Nickel aluminide	5	-	-	-	-	-	-	-	-	-	-	-	747-749	751	-	-
Aluminum oxide + Nickel (mon-) oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	609	-	-	-
Aluminum oxide + Niobium (pent-) oxide	4-I	-	611	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum oxide + Silicon (di-) oxide	4-I	-	-	-	-	-	613	-	615	-	617	-	619	-	-	-
Aluminum oxide + Silicon (di-) oxide + Titanium (di-) oxide	4-I	-	-	-	-	-	-	-	621	-	-	-	-	-	-	-
Aluminum oxide + Thorium (di-) oxide	4-I	-	623	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum oxide + Thorium (di-) oxide + Beryllium oxide .	4-I	-	625	-	-	-	-	-	-	-	627	-	-	-	-	-
Aluminum oxide + Titanium aluminide	5	-	-	-	-	-	-	-	-	-	-	-	753-755	757	-	-
Aluminum oxide + Titanium (di-) oxide + Chromium + + Molybdenum cermet	6-II	-	-	-	-	-	-	-	-	-	-	-	747	-	-	-
Aluminum oxide + Tungsten + + Chromium cermet	6-II	-	-	-	-	-	-	-	-	-	743	-	745	-	-	-
Aluminum oxide + Uranium (di-) oxide	4-I	629	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum oxide + Zirconium (di-) oxide	4-I	-	-	-	-	-	-	-	631	-	-	-	-	-	-	-
Aluminum oxide + Zirconium (di-) oxide + Beryllium oxide .	4-I	-	633	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum phosphate coating on nickel	6-II	-	-	-	-	-	-	-	-	-	-	-	1429	-	-	-
Aluminum phosphide (AlP) . . .	5	-	-	-	-	-	-	627	-	-	-	-	-	-	-	-

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Aluminum silicates	4-II	-	-	-	-	-	1187	1189	1191	1193	1195-1197	-	1199-1201	-	1203	-
$Al_2O_3 \cdot SiO_2$	4-II	-	-	-	-	-	-	1189	1191	-	1195	-		-	-	-
$3\ Al_2O_3 \cdot 2\ SiO_2$	4-II	-	-	-	-	-	-	1189	1191	1193	1197	-	1501	-	1203	-
Aluminum silicate + Aluminum oxide	4-II	-	-	-	-	-	-	-	1562	-	-	-	-	-	-	-
Aluminum silicate + Magnesium oxide	4-II	-	1564	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum silicate glass	4-II	-	-	-	-	-	-	1675	-	1677	-	-	1679	1681	1683-1685	-
Aluminum titanate ($Al_2O_3 \cdot TiO_2$) .	4-II	1368	1368	-	-	-	-	1370	1372	-	1374	-	-	-	-	-
Aluminum titanate, vitreous bonded	5	-	-	-	-	-	949-953	-	-	-	955 977	-	-	-	-	-
Aluminum titanate body	4-II	-	-	-	-	-	-	-	-	-	1374	-	-	-	-	-
Aluminum-vanadium intermetallics (Al_3V)	6-I	-	383	-	-	-	-	-	-	-	-	-	-	-	-	-
Alundun	4-I	-	-	-	-	-	-	-	11	-	-	-	-	-	-	-
Americium (Am)	1	32	-	-	-	32	-	-	-	-	-	-	-	-	-	34
Americium fluoride (AmF_3) . .	5	343	-	-	343	343	-	-	-	-	-	-	-	-	-	345
Analcite	4-II	-	-	-	-	-	-	1224	-	-	-	-	-	-	-	-
Anatase	4-I	445	-	-	-	-	-	454	-	-	-	-	-	-	-	-
Andalusite	4-II	-	-	-	-	-	-	1189	-	-	1195	-	-	-	-	-
Anilin resin	6-II	-	-	-	-	-	-	1078	-	-	-	-	-	-	-	-
Anorthite	4-II	-	-	-	-	-	-	1233	-	-	-	-	-	-	-	-
Antimony (Sb)	1	38	36	36	-	-	49	42	44	-	-	-	-	46	-	-
Antimony bismuth telluride ($Sb_{2-X}Bi_XTe_3$)	6-I	-	-	-	-	-	549	-	551	-	-	-	-	-	-	-
Antimony sulfide (Sb_2S_3)	5	-	-	-	-	-	-	643	-	-	-	-	-	645	-	-
Antimony telluride (Sb_2Te_3) . .	6-I	543	543	-	-	-	545	-	547	-	-	-	-	-	-	-
Antimony telluride + Bismuth telluride	6-I	-	-	-	-	-	705	-	-	-	-	-	-	-	-	-
Antimony telluride + Indium telluride	6-I	-	-	-	-	-	-	-	707	-	709	-	-	-	-	-
Antimony-zirconium intermetallics ($SbZr_2$)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Araldite casting resin 501 . . .	6-II	-	-	-	-	-	-	-	-	-	1012	-	-	-	-	-
Armalon 410L	6-II	-	-	-	-	-	-	-	1218	-	-	-	-	-	-	-
Armco iron	1	578	-	-	-	-	581	583	585	587	589	592	594, 598	602	-	-
Armcofoam	6-II	962	-	-	-	-	-	-	-	-	966	-	-	-	-	-
Arsenic aluminides																
AsAl	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
As_2Al_3	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic sulfide (As_2S_3).	5	-	-	-	-	-	-	647	-	-	-	-	-	-	-	-
Arsenic telluride (As_2Te_3) . . .	6-I	-	-	-	-	-	-	-	640	-	-	-	-	-	-	-

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B																
Baddeleyite	4-I	-	-	-	-	-	-	-	-	-	585	-	-	-	-	-
Bakelites																
BM-561	6-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
BM-704	6-II	-	-	-	-	-	-	-	-	-	998	-	-	-	-	-
BM-3510	6-II	-	-	-	-	-	-	-	-	-	996	-	-	-	-	-
BM-13014	6-II	-	-	-	-	-	-	-	-	-	992	-	-	-	-	-
BM-13080	6-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
BM-13335	6-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
BM-14316	6-II	-	-	-	-	-	-	-	-	-	998	-	-	-	-	-
BM-14726	6-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
BM-15140	6-II	-	-	-	-	-	-	-	-	-	992	-	-	-	-	-
BM-16468	6-II	-	-	-	-	-	-	-	-	-	992	-	-	-	-	-
BM-17711	6-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
BM-17849	6-II	-	-	-	-	-	-	-	-	-	1000	-	-	-	-	-
[illegible]	6-II	-	-	-	-	-	-	-	-	-	1645	-	-	-	-	-
Barium [illegible]ium	2-I	-	36	36	-	-	-	-	-	-	-	-	-	-	-	-
Barium alu[illegible]ates																
$BaO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	977	-	-	-	-	-
$3\ BaO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	977	-	-	-	-	-
Barium aluminum silicate ($BaO \cdot Al_2O_3 \cdot 2\ SiO_2$)	4-II	-	-	-	-	-	-	1205	-	-	1207	-	-	-	-	-
Barium beryllium titanate ($BaO \cdot BeO \cdot TiO_2$)	4-II	-	-	-	-	-	-	-	-	-	1390	-	-	-	-	-
Barium borate glass	4-II	-	-	-	-	-	-	-	-	-	1609	-	-	-	-	-
Barium (hexa-)boride (BaB_6) . .	6-I	-	296	-	-	-	300	-	-	-	302	-	-	-	-	-
Barium calcium silicate	4-II	-	-	-	-	-	-	-	-	-	1211	-	-	-	-	-
Barium calcium titanate [$(Ca_xBa_{1-x})O \cdot TiO_2$]	4-II	-	-	-	-	-	-	-	1392	1394	-	-	-	-	-	-
Barium carbide (BaC_2)	5	-	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium cerium lead titanate [$(Ba_{1-x-y}Pb_xCe_y)O \cdot TiO_2$] . .	4-II	-	-	-	-	-	1398	-	-	-	-	-	-	-	-	-
Barium cerium titanate [$(Ba_{1-x}Ce_x)O \cdot TiO_2$]	4-II	-	-	-	-	-	1396	-	-	-	-	-	-	-	-	-
Barium cerium titanate silicate [$(Ba_{1-x}Ce_x)O \cdot (Ti_{1-x}Si_x)O_2$] .	4-II	-	-	-	-	-	1209	-	-	-	-	-	-	-	-	-
Barium cerium titanate stannate [$(Ba_{1-x}Ce_x)O \cdot (Ti_{1-y}Sn_y)O_2$] .	4-II	-	-	-	-	-	1354	-	-	-	-	-	-	-	-	-
Barium cerium titanate zirconate [$(Ba_{1-x}Ce_x)O \cdot (Ti_{1-y}Zr_y)O_2$] .	4-II	-	-	-	-	-	1500	-	-	-	-	-	-	-	-	-
Barium copper silicate ($BaO \cdot CuO \cdot 4\ SiO_2$)	4-II	-	-	-	-	-	-	-	-	-	1213	-	-	-	-	-
Barium crown glass	4-II	-	-	-	-	-	-	1827	-	-	-	-	-	-	-	-
Barium fluoborate glass	4-II	-	-	-	-	-	-	-	-	-	1611	-	-	-	-	-

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Barium fluoride (BaF_2)	5	-	-	-	-	-	-	-	347	-	-	-	-	349	-	-
Barium lanthanum titanate [$(La_xBa_{1-x})O \cdot TiO_3$]	4-II	-	-	-	-	-	1400	-	1402	-	-	-	-	-	-	-
Barium-lead intermetallics (Ba_2Pb)	6-I	-	-	-	-	-	-	-	642	-	-	-	-	-	-	-
Barium lead silicate glass . . .	4-II	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-
Barium lead titanates	4-II	-	-	-	-	-	-	-	-	-	1404	-	-	-	-	-
Barium magnesium silicates																
$BaO \cdot 3\,MgO \cdot SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1215	-	-	-	-	-
$BaO \cdot 4\,MgO \cdot 3.5\,SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1215	-	-	-	-	-
Barium magnesium aluminum silicate ($3\,BaO \cdot 2\,MgO \cdot 8\,Al_2O_3 \cdot 26\,SiO_2$)	4-II	-	-	-	-	-	-	-	-	-	1217-1221	-	-	-	-	-
Barium nitride (Ba_3N_2).	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium oxide (BaO)	4-I	-	-	-	-	-	49	51	53	-	-	-	-	-	-	-
Barium oxide + Strontium oxide .	4-I	-	-	-	-	-	-	-	641	-	-	-	-	-	-	-
Barium oxide + Strontium oxide + + Zirconium cermet	6-II	-	-	-	-	-	-	-	911	-	-	-	-	-	-	-
Barium oxide + Strontium oxide + + Zirconium (di-)oxide	4-I	-	-	-	-	-	-	-	643	-	-	-	-	-	-	-
Barium phosphide (Ba_3P_2) . . .	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium selenide (BaSe)	6-I	-	365	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium silicate glass	4-II	-	-	-	-	-	-	-	-	1687	-	-	-	-	-	-
Barium silicide ($BaSi_2$)	6-I	-	371	-	-	-	-	-	-	-	373	-	-	-	-	-
Barium stannide (Ba_2Sn)	6-I	-	-	-	-	-	-	-	531	-	-	-	-	-	-	-
Barium strontium ferrites [$(Ba_xSr_{1-x})O \cdot 6\,Fe_2O_3$] . . .	4-II	1067	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium strontium titanates . . .	4-II	-	-	-	-	-	-	-	-	-	1406	-	-	-	-	-
Barium sulfide (BaS)	5	649	649	-	-	-	-	651	-	-	-	-	-	-	-	-
Barium telluride (BaTe)	6-I	-	636	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium titanates																
$BaO \cdot TiO_2$	4-II	-	1376	-	-	-	1378-1380	1382	1384	1386	1388	-	-	-	-	-
$BaO \cdot 3\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1388	-	-	-	-	-
$BaO \cdot 4\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1388	-	-	-	-	-
$BaO \cdot 5\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1388	-	-	-	-	-
$BaO \cdot 6\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1388	-	-	-	-	-
$BaO \cdot 18\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1388	-	-	-	-	-
$2\,BaO \cdot TiO_2$	4-II	-	1376	-	-	-	-	1382	-	-	-	-	-	-	-	-
Barium titanate coating on niobium-zirconium alloy . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1369	-	-	-
Barium titanate + Calcium titanate	4-II	-	1579	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium titanate + Lead titanate .	4-II	-	-	-	-	-	-	1581	-	-	-	-	-	-	-	-
Barium titanate + Manganese niobate	4-II	-	-	-	-	-	-	-	1583	-	-	-	-	-	-	-

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Barium titanate + Strontium titanate	4-II	-	-	-	-	-	-	1585	-	-	-	-	-	-	-	-
Barium titanium germanium oxide ($BaO \cdot TiO_2 \cdot 3\ GeO_2$). . .	4-II	-	-	-	-	-	-	-	-	-	1127	-	-	-	-	-
Barium titanium silicate glass	4-II	-	-	-	-	-	-	-	-	-	1691	-	-	-	-	-
Barium uranate ($BaO \cdot UO_3$). . .	[illegible]	-	1482	-	-	-	-	1484	-	-	-	-	-	-	-	-
Barium zirconate ($BaO \cdot ZrO_2$) .	4-II	-	-	-	-	-	-	1496	-	-	1498	-	-	-	-	-
Beetle	6-II	-	-	-	-	-	-	-	-	-	1002	-	-	-	-	-
Beryl	4-II	-	-	-	-	-	-	-	1225	-	1227	-	-	-	-	-
Beryllia	4-I	55	55	55	55	-	57	59	61	65	67	71	73-77	79-81	33	85
Beryllium (Be)	1	48	48	48	48	48	50	53	55	57	59	-	61	63	-	65
Beryllium QM-V	1	-	-	-	-	-	51	-	-	-	-	-	-	-	-	-
Beryllium + ΣX_i	2-II	841	-	-	-	-	-	843	845	-	847	-	-	-	-	-
Beryllium + Aluminum.	2-I	38	-	-	-	-	-	-	40	42	-	-	44	-	-	-
Beryllium + Aluminum + ΣX_i . .	2-II	-	-	-	-	-	-	-	-	-	833	-	-	-	-	-
Beryllium + Beryllium oxide cermet	6-II	751	-	-	-	751	-	753	757	-	762	-	-	-	-	764-766
Beryllium + Magnesium + ΣX_i .	2-II	835	-	-	-	-	837	-	839	-	-	-	-	-	-	-
Beryllium aluminate ($BeO \cdot Al_2O_3$)	4-II	-	-	-	-	-	-	979	-	-	981	-	-	-	-	-
Beryllium aluminosilicate ($3\ BeO \cdot Al_2O_3 \cdot 6\ SiO_2$)	4-II	-	-	-	-	-	-	-	1225	-	1227	-	-	-	-	-
Beryllium borides																
BeB	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BeB_2	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
BeB_4	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
BeB_6	6-I	295	296	-	-	-	-	-	-	-	-	-	-	-	-	-
BeB_9	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2B	6-I	295	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_3B	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium indium selenide ($InBeSe_3$)	6-I	-	-	-	-	-	-	-	329	-	-	-	-	-	-	-
Beryllium carbide (Be_2C) . . .	5	15	15	15	15	-	-	17	-	-	19	-	-	-	-	21
Beryllium carbide + ΣX_i	5	-	-	-	-	-	-	303	305	-	-	-	-	-	-	-
Beryllium cermet BM15	6-II	-	-	-	-	-	-	-	757	-	-	-	-	-	-	-
Beryllium cermet LYB 1102 . .	6-II	-	-	-	-	-	-		757	-	-	-	-	-	-	-
Beryllium cermet Y6825	6-II	-	-	-	-		-	-	757	-	-	-	-	-	-	-
Beryllium cermet Y6626	6-II	-	-	-	-	-	-	-	757	-	-	-	-	-	-	-
Beryllium cermet Y9394	6-II	-	-	-	-	-	-	-	757	-	-	-	-	-	-	-
Beryllium cermet YB1000 . . .	6-II	-	-	-	-	-	-	-	31	-	-	-	-	-	-	-
Beryllium cermet YB9052 . . .	6-II	-	-	-	-	-	-	753	757	-	762	-	-	-	-	-
Beryllium cermet YB9053 . . .	6-II	-	-	-	-	-	-	-	-	-	762	-	-	-	-	-
Beryllium cermet YB9054 . . .	6-II	-	-	-	-	-	-	753	-	-	762	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Beryllium chromite ($BeO \cdot Cr_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1049	-	-	-	-	-
Beryllium fluoride (BeF_2) . . .	5	351	351	351	351	351	-	-	-	-	-	-	-	-	-	353
Beryllium nitrides																
Be_3N_2	5	-	495	495	495	-	-	-	497	-	-	-	-	-	-	-
Be_3N_4	5	-	495	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium oxides																
Beryllium oxide (BeO) . . .	4-I	55	55	55	55	-	57	59	61	65	67	71	73-77	79-81	83	85
BD-98	4-I	-	-	-	-	-	-	-	61	65	-	-	77	-	-	-
UOX grade	4-I	-	-	-	-	-	-	-	61	-	-	-	-	-	-	-
Beryllium oxide + Aluminum oxide + Magnesium oxide . . .	4-I	-	-	-	-	-	-	-	-	-	645	-	-	-	-	-
Beryllium oxide + Aluminum oxide + Thorium (di-)oxide . .	4-I	-	-	-	-	-	-	-	647	-	649	-	-	-	-	-
Beryllium oxide + Aluminum oxide + Thorium (di-)oxide + + Magnesium oxide.	4-I	-	-	-	-	-	-	-	651	-	-	-	-	-	-	-
Beryllium oxide + Aluminum oxide + Zirconium (di-)oxide .	4-I	-	-	-	-	-	-	-	653	-	-	-	-	-	-	-
Beryllium oxide + Aluminum oxide + Zirconium (di-)oxide + + Magnesium oxide.	4-I	-	-	-	-	-	-	-	655	-	-	-	-	-	-	-
Beryllium oxide + Beryllium cermet	6-II	-	-	-	-	751	-	755	760	-	762	-	-	-	-	-
Beryllium oxide + Beryllium + +Molybdenum cermet.	6-II	-	-	-	-	-	-	768	770	-	772	-	-	-	-	-
Beryllium oxide + Beryllium + + Silicon cermet	6-II	-	-	-	-	-	-	-	774	-	776	-	-	-	-	-
Beryllium oxide + Magnesium oxide + Aluminum oxide . . .	4-I	-	-	-	-	-	-	-	657	-	-	-	-	-	-	-
Beryllium oxide + Magnesium oxide + Aluminum oxide + + Thorium (di-)oxide	4-I	-	-	-	-	-	-	-	659	-	-	-	-	-	-	-
Beryllium oxide + Magnesium oxide + Aluminum oxide + + Zirconium (di-)oxide. . . .	4-I	-	-	-	-	-	-	-	661	-	-	-	-	-	-	-
Beryllium oxide + Magnesium oxide + Zirconium (di-)oxide + + Aluminum oxide	4-I	-	-	-	-	-	-	-	663	-	-	-	-	-	-	-
Beryllium oxide + Molybdenum cermet	6-II	-	-	-	-	-	-	778	-	-	-	-	-	-	-	-
Beryllium oxide + Molybdenum beryllide	5	-	-	-	-	-	-	759	-	-	-	-	-	-	-	-
Beryllium oxide + Niobium cermet	6-II	780	-	-	-	-	-	-	-	-	782	-	-	-	-	-
Beryllium oxide + Niobium beryllide	5	-	-	-	-	-	-	761	-	-	-	-	-	-	-	-
Beryllium oxide + Tantalum beryllide	5	-	-	-	-	-	-	763	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Beryllium oxide + Thorium (di-)oxide + Aluminum oxide .	4-I	-	-	-	-	-	-	-	-	-	665	-	-	-	-	-
Beryllium oxide + Titanium beryllide	5	-	-	-	-	-	-	765	-	-	-	-	-	-	-	-
Beryllium oxide + Uranium (di-)oxide	4-I	-	-	-	-	-	-	-	667	-	-	-	-	-	-	-
Beryllium oxide + Zirconium beryllide	5	-	-	-	-	-	-	767	-	-	-	-	-	-	-	-
Beryllium oxide + Zirconium (di-)oxide + Magnesium oxide + + Aluminum oxide	4-I	-	-	-	-	-	-	-	669	..	-	-	-	-	-	-
Beryllium oxide porcelain type 4811	5	1003	-	-	-	-	-	-	1017	-	-	-	-	-	-	-
Beryllium silicate (2 $BeO \cdot SiO_2$).	4-II										1223					
Beryllium sulfide (BeS)	5	653	653	-	-	-	-	-	-	-	-	-	-	-	-	655
Beryllium titanates																
$BeO \cdot TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1408	-	-	-	-	-
2 $BeO \cdot TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1408	-	-	-	-	-
4 $BeO \cdot TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1408	-	-	-	-	-
6 $BeO \cdot TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1408	-	-	-	-	-
Bismuth-cerium intermetallics																
BiCe	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
$BiCe_3$	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Bi_3Ce_4	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth selenide tellurides ($Bi_2Te_{3-x}Se_x$)	6-I	-	-	-	-	-	564	-	566	-	-	-	-	-	-	-
Bismuth stannate ($Bi_2O_3 \cdot 3\ SnO_2$)	4-II								1357							
Bismuth telluride(Bi_2Te_3) . . .	6-I	553	553	-	-	-	555	557	559	561	-	-	-	-	-	-
Bismuth telluride + Bismuth selenide	6-I	-	-	-	-	-	711	-	713	-	-	-	-	-	-	-
Bismuth tellurium sulfide (Bi_2Te_2S)	5	-	-	-	-	-	657	-	659	-	-	-	-	-	-	-
Boral clad with boron carbide. .	5	979	-	-	-	-	-	981	-	-	-	-	-	-	-	-
Borate glasses	4-II	1605	-	-	-	-	1607	-	-	-	1609-1633	-	-	-	-	-
Borolites																
Boroilte	6-II	842	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Borolite I. grade F	6-II	-	-	-	-	-	-	846	-	-	-	-	-	-	-	-
Borolite I, grade G	6-II	-	-	-	-	-	844	-	-	-	850	-	-	-	-	-
Borolit. I, grade S	6-II	-	-	-	-	-	844	846	-	-	-	-	-	-	-	-
Borolite I[illegible]	6-II	913	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	1	67	67	-	67	67	69	71	-	-	-	-	-	-	-	73
Boron coating on molybdenum .	6-II	-	-	-	-	-	-	-	-	-	-	-	1289	-	-	-
Boron coating on niobium-zirconium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	291	-	-	-
Boron + ΣX_i	2-II	849	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Boron + Iron	2-I	-	-	-	-	46	-	-	-	-	-	-	-	-	-	48
Boron + Silicon	2-I	-	-	-	-	-	50	-	-	-	-	-	-	-	-	-
Boron aluminate (2 $B_2O_3 \cdot 9 Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	983	-	-	-	-	-
Boron carbide (B_4C)	5	25	23	-	-	-	-	27	29	31	33	-	35	-	-	37
Boron carbide clad with aluminum	5	979	-	-	-	-	-	981	-	-	-	-	-	-	-	-
Boron carbide coating on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1403	1405	-	-
Boron carbide + Iron cermet . .	6-II	928	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron oxide (B_2O_3)	4-I	-	-	-	-	-	-	87	-	-	-	-	-	-	-	89
Boron oxide glass	4-II	-	-	-	-	-	-	1635	-	-	-	-	-	-	-	-
Boron nitride (BN)	5	499	499	-	499	-	501	503	505	-	507	-	509-513	515	-	-
Boron nitride + Boron oxide . .	5	-	-	-	-	-	832	834	836	-	838	-	-	-	-	-
Boron nitride + Graphite	5	-	-	-	-	-	-	828	830	-	-	-	-	-	-	-
Boron phosphide (BP)	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron silicides																
B_4Si	6-I	-	-	-	-	-	-	-	-	-	-	-	375-377	379	-	-
B_6Si	6-I	-	-	-	-	-	-	-	-	-	-	-	375-377	379	-	-
Borosilicate glass	4-II	1693	1693	-	-	-	1695	1697	1699	1701	1703	-	1705-1707	1709	1711-1713	-
Brass	2-I	-	-	-	-	-	170	172	-	174	-	-	178-180	182	-	-
	2-II								1090							
Brass, aluminum	2-II	-	-	-	-	-	-	-	-	-	1004	-	-	-	-	-
Brass, free cutting leaded . . .	2-I	168	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brass, red	2-II	-	-	-	-	-	-	-	-	-	1002	-	-	-	-	-
Brass, yellow	2-I	-	-	-	-	-	-	-	-	174	-	-	176	-	-	-
	2-II								1000							
Brazing alloy																
GE-62	2-II	-	-	-	-	-	-	-	-	-	1168	-	-	-	-	-
GEH62-V	2-II	-	-	-	-	-	-	1130	-	-	-	-	-	-	-	-
GE-76	2-II	-	-	-	-	-	-	-	-	-	1378	-	-	-	-	-
Bricks																
Bricks	5	-	-	-	-	-	1029	-	1031-1033	-	1035-1037	-	1039-1043	-	-	-
Chrome-magnesite	5	-	-	-	-	-	1029	-	-	-	-	-	1039	-	-	-
Chromomagnesite	4-I	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-
Forsterite	5	-	-	-	-	-	1029	-	1033	-	-	-	-	-	-	-
K-30 insulating	5	-	-	-	-	-	-	-	-	-	1035	-	-	-	-	-
Magnesia	5	-	-	-	-	-	1029	-	-	-	-	-	-	-	-	-
Magnesite	4-I	-	-	-	-	-	-	-	743	733, 737	-	-	-	-	-	-

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Bricks (cont.)																
Magnesite-chrome	5	-	-	-	-	-	1029	-	-	-	-	-	-	-	-	-
Magnesite "hr"	5	-	-	-	-	-	-	-	1033	-	-	-	-	-	-	-
Mica	5	-	-	-	-	-	-	-	989	-	-	-	-	-	-	-
Mica, white	5	-	-	-	-	-	-	-	989	-	-	-	-	-	-	-
Silica	4-I	-	-	-	-	-	-	-	816	363, 795, 816	-	-	-	-	-	-
. . . .	5	-	-	-	-	-	-	-	-	-	1037	-	1041	-	-	-
Silicon carbide	5	-	-	-	-	-	-	-	125	-	-	-	-	-	-	-
Sillimanite	4-I	-	-	-	-	-	-	-	615	-	-	-	-	-	-	-
Vermiculite insulating. . . .	5	-	-	-	-	-	-	-	989	-	-	-	-	-	-	-
Bromyrite	5	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-
Bronze	2-I	154	-	-	-	-	156	-	-	-	-	-	162	-	-	-
. . . .	2-II	-	-	-	-	-	-	-	-	-	998	-	-	-	-	-
Bronze, aluminum	2-II	-	-	-	-	-	-	-	-	-	950	952	954-956	960	-	-
Bronze, lead	2-II	-	-	-	-	-	-	-	-	-	976	-	-	-	-	-
Bronze, phosnic	2-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Bronze, silicon	2-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
Bronze, tellurium-aluminum . .	2-II	-	-	-	-	-	-	-	-	-	950	-	-	-	-	-
Bronze, Tin-Zinc	2-II	-	-	-	-	-	-	-	-	-	998	-	-	-	-	-
Buna S	6-II	-	-	-	-	-	-	-	-	1066	-	-	-	-	-	-
Butadiene-acrylonitrile copolymer	6-II	-	-	-	-	-	-	1054	-	1060	-	-	-	-	-	-
Butyl GR-1	6-II	-	-	-	-	-	-	-	-	1062	-	-	-	-	-	-
C																
CA-2, carbide tool steel	6-II	-	-	-	-	-	-	-	559	-	-	-	-	-	-	-
CA-4, carbide tool steel	6-II	-	-	-	-	-	-	-	559	-	-	-	-	-	-	-
Cadmium (Cd)	1	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-
Cadmium + Silver	2-I	-	52	5[illegible]	-	-	-	-	-	-	-	-	-	54	-	-
Cadmium lead silicate glass . .	4-II	-	-	-	-	-	1731	-	-	-	-	-	-	-	-	-
Cadmium oxides																
CdO	4-I	91	91	-	-	91	-	93	-	-	-	-	-	-	-	97
Cd_2O_3	4-I	-	-	-	-	-	-	-	-	-	95	-	-	-	-	-
Cadmium sulfide (CdS).	[illegible]	-	-	-	-	-	661	663	-	-	-	-	665	-	-	-
Cadmium telluride (CdTe) . . .	6-I	-	-	-	-	-	568	570	-	-	-	-	-	-	-	-
Calcia	4-I	99	99	-	-	-	101	103	105	-	107	-	-	-	-	109
Calcium (Ca)	1	-	77	77	-	-	73	-	-	-	-	-	-	-	-	81
Calcium + Magnesium	2-I	-	56	-	-	-	58	-	-	-	-	-	-	-	-	-

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Calcium aluminates																
$CaO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	597	-	-	-	-	-	-	-	-
$CaO \cdot 2\,Al_2O_3$	4-II	595	595	-	-	-	-	597	-	-	-	-	-	-	-	-
$CaO \cdot 6\,Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	591	-	-	-	-	-
$3\,CaO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	597	-	-	-	-	-	-	-	-
$3\,CaO \cdot 5\,Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	589	-	-	-	-	-
$12\,CaO \cdot 7\,Al_2O_3$	4-II	-	-	-	-	-	-	597	-	-	-	-	-	-	-	-
Calcium aluminate + Molybdenum disilicide cermet	6-II	-	-	-	-	-	-	-	-	-	754	-	-	-	-	-
Calcium aluminum silicates																
$CaO \cdot Al_2O_3 \cdot 2\,SiO_2$	4-II	-	-	-	-	-	-	1233	-	-	1235	-	-	-	-	-
$2\,CaO \cdot Al_2O_3 \cdot SiO_2$	4-II	-	-	-	-	-	-	1233	-	-	1235	-	-	-	-	-
$2\,CaO \cdot 2\,Al_2O_3 \cdot 5\,SiO_2 \cdot 7\,H_2O$	4-II	-	-	-	-	-	-	1233	-	-	-	-	-	-	-	-
Calcium barium cerium titanate $[(Ba_{1-x-y}Ca_xCe_y)O \cdot TiO_2]$	4-II	-	-	-	-	-	1420	-	-	-	-	-	-	-	-	-
Calcium borates																
$CaO \cdot B_2O_3$	4-II	-	1837	1837	-	-	-	1839	-	-	-	-	-	-	-	-
$CaO \cdot 2\,B_2O_3$	4-II	-	1837	1837	-	-	-	1839	-	-	-	-	-	-	-	-
$2\,CaO \cdot B_2O_3$	4-II		1837	1837	-	-	-	1839	-	-	-	-	-	-	-	-
$3\,CaO \cdot B_2O_3$	4-II	-	1837	1837	-	-	-	1840	-	-	-	-	-	-	-	-
Calcium boric glass	4-II	-	-	-	-	-	-	-	-	-	1613	-	-	-	-	-
Calcium (hexa-)boride (CaB_6)	6-I	-	296	-	-	-	300	-	-	-	302	-	-	-	-	-
Calcium carbide + Calcium oxide	5	-	-	-	-	-	-	805	-	-	-	-	-	-	-	-
Calcium carbonate $(CaCO_3)$	4-II	-	-	-	-	-	-	-	-	-	-	-	-	1345	-	-
Calcium copper silicate $(CaO \cdot CuO \cdot 4\,SiO_2)$	4-I	-	-	-	-	-	-	-	-	-	1238	-	-	-	-	-
Calcium ferrites																
$CaO \cdot Fe_2O_3$	4-II	-	-	-	-	-	-	1869	-	-	-	-	-	-	-	-
$2\,CaO \cdot Fe_2O_3$	4-II	-	-	-	-	-	-	1869	-	-	-	-	-	-	-	-
Calcium fluoride (CaF_2)	5	356	355	-	-	-	-	-	357	-	359	-	-	361	-	-
Calcium hafnate $(CaO \cdot HfO_2)$	4-II	1107	1107	-	-	-	-	-	-	-	1109	-	-	-	-	-
Calcium lanthanum manganese oxide $(La_xCa_{1-x}MnO_3)$	4-II	-	-	-	-	-	1129	-	1131	-	-	-	-	-	-	-
Calcium-lead intermetallics (Ca_2Pb)	6-I	-	-	-	-	-	-	-	646	-	-	-	-	-	-	-
Calcium lead silicate glass	4-II	-	-	-	-	-	1733	-	-	-	-	-	-	-	-	-
Calcium magnesium silicates																
$CaO \cdot MgO \cdot 2\,SiO_2$	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
$2\,CaO \cdot MgO \cdot 2\,SiO_2$	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
$3\,CaO \cdot MgO \cdot 2\,SiO_2$	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
$2\,CaO \cdot 5\,MgO \cdot 8\,SiO_2 \cdot 2\,H_2O$	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
Calcium molybdate $(CaO \cdot MoO_3)$	4-II	-	-	-	-	-	-	1111	-	-	-	-	-	-	-	-
Calcium nitrides																
CaN	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca_3N_2	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Calcium oxide (CaO)	4-I	99	89	-	-	-	101	103	105	-	107	-	-	-	-	109
Calcium oxide + Titanium (di-) oxide	4-I	-	-	-	-	-	-	-	-	-	671	-	-	-	-	-
Calcium selenides (CaSe) . . .	6-I	-	365	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium silicates																
$CaO \cdot SiO_2$	4-II	-	-	-	-	-	-	1229	-	-	1231	-	-	-	-	-
$2\ CaO \cdot SiO_2$	4-II	-	-	-	-	-	-	1229	-	-	1231	-	-	-	-	-
$3\ CaO \cdot SiO_2$	4-II	-	-	-	-	-	-	1229	-	-	-	-	-	-	-	-
Calcium silicate glass	4-II	-	-	-	-	-	-	-	-	-	-	-	-	-	1729	-
Calcium silicides																
CaSi	6-I	-	523	-	-	-	-	-	-	-	-	-	-	-	-	-
$CaSi_2$	6-I	-	523	-	-	-	-	-	-	-	-	-	-	-	-	-
Ca_2Si	6-I	-	523	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium stannate ($CaO \cdot SnO_2$) . .	4-II	-	-	-	-	-	-	-	1359	-	-	-	-	-	-	-
Calcium strontium barium cerium titanate [$(Ba_{1-x-y-z}Ca_xSr_yCe_z)O \cdot TiO_2$]	4-II	-	-	-	-	-	1422	-	-	-	-	-	-	-	-	-
Calcium titanates																
$CaO \cdot TiO_2$	4-II	1410	1410	-	-	-	1412	1414	1416	-	1418	-	-	-	-	-
$3\ CaO \cdot 2\ TiO_2$	4-II	-	-	-	-	-	-	1414	-	-	1418	-	-	-	-	-
Calcium titanate coating on niobium-zirconium alloy . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1371	-	-	-
Calcium tungstate ($CaO \cdot WO_3$) .	4-II	-	-	-	-	-	-	1472	-	-	-	-	-	-	-	-
Calcium uranate ($CaO \cdot UO_3$) . .	4-II	-	1482	-	-	-	-	1486	-	-	-	-	-	-	-	-
Calcium vanadates																
$CaO \cdot V_2O_5$	4-II	-	-	-	-	-	-	1468	-	-	-	-	-	-	-	-
$2\ CaO \cdot V_2O_5$	4-II	-	-	-	-	-	-	1486	-	-	-	-	-	-	-	-
$3\ CaO \cdot V_2O_5$	4-II	-	-	-	-	-	-	1488	-	-	-	-	-	-	-	-
Calcium zirconate ($CaO \cdot ZrO_2$) .	4-II	1502	1502	-	-	-	-	1504	-	-	1506	-	-	-	-	-
Carbide tool steels	6-II	-	-	-	-	-	-	-	889	-	-	-	-	-	-	-
Carbofrax	5	-	-	-	-	-	-	-	307	-	-	-	309-311	-	-	-
Carboloy 44A	6-II	387	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carboloy 55A	6-II	887	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbons																
Carbon (C)	1	83	-	-	-	83	85	-	87	-	-	-	91-93	95	-	-
Amorphous	1	-	-	-	-	-	83	-	87	-	-	-	-	-	-	-
GA grade	1	-	-	-	-	-	-	-	-	-	-	-	91	95	-	-
Pyrolytic	1	83	-	-	-	-	-	-	89	-	-	-	-	-	-	-
Carbon coating on molybdenum .	6-II	-	-	-	-	-	-	-	-	-	-	1293	1295	-	-	-
Carbon electrode	-	-	-	-	-	-	85	-	87	-	-	-	-	-	-	-
Carbon impregnated graphite . .	1	-	-	-	-	-	-	-	358	-	-	-	-	-	-	-
Carbon-phenolic laminate MX-4926	6-II	-	-	-	-	-	-	1134	-	-	-	-	-	-	-	-

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Carbon steels	3	-	-	-	-	3	5, 312	7-10	-	12-14	16-20	-	-	-	-	22
Carbonyl nickel	1	-	694	-	-	-	-	-	-	-	-	-	-	-	-	-
Cast iron	3	27	-	-	-	-	-	-	29-37, 437	-	39-41, 444	-	-	-	-	-
Cast iron, gray (see grey cast iron)																
Cast iron, nodular (see Nodular cast iron)																
Castolite	6-II	974	-	-	-	-	-	-	976	1082	976	-	-	-	-	-
Catalin	6-II	-	-	-	-	-	-	-	-	-	986	-	-	-	-	-
Cellulose acetates	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Cellulose acetate, expanded . .	6-II	-	-	-	-	-	-	-	939	-	-	-	-	-	-	-
Cellulose acetate butyrate . . .	6-II	-	-	-	-	-	-	-	-	-	946	-	-	-	-	-
Cellulose propionate.	6-II	-	-	-	-	-	-	-	-	-	944	-	-	-	-	-
Cement-barytes aggregate . . .	5	-	-	-	-	-	-	1023	1025	-	-	-	-	-	-	-
Ceramic laminate	6-II	-	-	-	-	-	-	-	-	-	1225	-	-	-	-	-
Cercor	4-II	-	-	-	-	-	-	-	-	1591	-	-	-	-	-	-
Ceria	4-I	111	111	-	-	-	113	115	119	-	121	-	124-128	-	-	-
Cerium (Ce)	1	402	402	402	402	402	404	406	-	-	-	-	-	..	-	408
Cerium + ΣX_i	2-II	-	853	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium + Neodymium	2-I	-	-	-	-	-	-	-	-	-	60	-	-	-	-	-
Cerium + Silicon + ΣX_i	2-II	-	851	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium aluminate ($2CeO \cdot 3Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	993	-	-	-	-	-
Cerium aluminides																
CeAl	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAl_2$	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAl_4$	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_3Al_2	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium aluminum silicides ($Ce_2Al_3Si_2$)	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-bismuth intermetallics (CeBi)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium borides																
CeB_4	6-I	296	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CeB_6	6-I	295, 296	296	-	-	-	300	-	-	-	302	-	-	-	-	-
Cerium (tri-)bromide ($CeB4_3$) .	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-cadmium intermetallics																
CeCd	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCd_2$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCd_3$	6-I	662	-	-	-	..	-	-	-	-	-	-	-	-	-	-
$CeCd_{11}$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Cerium carbides																
CeC_2	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium (tri-)chloride ($CeCl_3$) .	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-cobalt intermetallics																
$CeCo_2$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCo_5$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-copper intermetallics																
CeCu	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCu_2$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCu_4$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeCu_6$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium (tri-)fluoride (CeF_3) . .	5	363	363	-	-	-	-	365	-	-	-	-	-	-	-	-
Cerium-gallium intermetallics ($CeGa_2$)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-gold intermetallics																
CeAu	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAu_2$	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAu_3$	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Au	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium hydride (CeH_3).	5	457	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-indium intermetallics ($CeIn_3$)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium (tri-)iodide (CeI_3) . . .	5	-	477	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-lead intermetallics																
$CePb_3$	6-I	662	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Pb	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-magnesium intermetallics																
CeMg	6-I	662	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeMg_3$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeMg_9$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_4Mg	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-mercury intermetallics (CeHg)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-nickel intermetallics																
$CeNi_2$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeNi_3$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeNi_5$	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Ni_7	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium nitride (CeN)	5	621	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-osmium intermetallics ($CeOs_2$)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Cerium oxides																
CeO	4-I	111	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CeO_2	4-I	111	111	-	-	-	113	115	119	-	121	-	124-128	-	-	-
Ce_2O_3	4-I	111	-	-	-	-	-	117	-	-	-	-	-	-	-	-
Cerium (di-)oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	673	-	-	-	-	-	-	-
Cerium (di-)oxide + Uranium oxides	4-I	375	-	-	-	-	-	-	677	-	-	-	-	-	-	-
Cerium phosphide (CeP)	5	635	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-platinum intermetallics ($CePt_2$)	6-I	662	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium selenides																
CeSe	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_3Se_4	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium silicide ($CeSi_2$)	6-I	523	523-524	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-silver intermetallics																
CeAg	6-I	662	662	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAg_2$	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeAg_3$	6-I	-	662	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium stannides																
$CeSn_3$	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Sn	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Sn_3	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium sulfides																
CeS	5	667	667	-	-	-	670	672	674	-	676	-	-	-	-	678
CeS_2	5	667	667	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2S_3	5	667	667	-	-	-	-	672	674	-	676	-	-	-	-	-
Ce_3S_4	5	667	667	-	-	-	-	-	-	-	-	-	-	-	-	678
Cerium tellurides																
$CeTe_2$	6-I	636	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_3Te_4	6-I	636	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium-thallium intermetallics																
CeTl	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
$CeTl_3$	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Ce_2Tl	6-I	-	663	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium vanadate ($Ce_2O_3 \cdot V_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1490	-	-	-	-	-
Cermets (also see individual cermets)																
Aluminum-chromium-molybdenum cermets	6-II	930	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum-nickel-titanium cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Cermets (also see individual cermets) (cont.)																
Aluminum oxide + Aluminum cermet	6-II	-	-	-	-	-	-	-	-	-	729	-	-	-	-	-
Aluminum oxide + Chromium cermet	6-II	731	-	-	-	-	-	-	911	-	733	-	735	-	-	-
Aluminum oxide + Chromium + + Molybdenum cermet . . .	6-II	73[illegible]	-	-	-	-	-	-	-	-	739	-	-	-	-	-
Aluminum oxide + Iron cermet	6-II	-	-	-	-	-	-	-	-	-	741	-	-	-	-	-
Aluminum oxide + Titanium (di-)oxide + Chromium + + Molybdenum cermet . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	747	-	-	-
Aluminum oxide + Tungsten + + Chromium cermet	6-II	-	-	-	-	-	-	-	-	-	743	-	745	-	-	-
Barium oxide + Strontium oxide + Zirconium cermet. .	6-II	-	-	-	-	-	-	-	911	-	-	-	-	-	-	-
Beryllium + Beryllium oxide cermet	6-II	751	-	-	-	751	-	753	757	-	762	-	-	-	-	764-766
Beryllium oxide + Beryllium cermet	6-II	-	-	-	-	751	-	755	760	-	762	-	-	-	-	-
Beryllium oxide + Beryllium + + Molybdenum cermet . . .	6-II	-	-	-	-	-	-	768	770	-	772	-	-	-	-	-
Beryllium oxide + Beryllium + + Silicon cermet	6-II	-	-	-	-	-	-	-	774	-	776	-	-	-	-	-
Beryllium oxide + Molybdenum cermet	6-II	-	-	-	-	-	-	778	-	-	-	-	-	-	-	-
Beryllium oxide + Niobium cermet	6-II	780	-	-	-	-	-	-	-	-	782	-	-	-	-	-
Boron carbide + Iron cermet.	6-II	928	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium aluminate + + Molybdenum (di-)silicide cermet	6-II	-	-	-	-	-	-	-	-	-	784	-	-	-	-	-
Chromium-molybdenum-silicon cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-silicon-titanium cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium boride + Chromium-molybdenum intermetallic cermet	6-II	913	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium silicide cermets .	6-II	-	-	-	-	-	-	-	-	-	915	-	-	-	-	-
Chromium-titanium intermetallics + Copper cermets.	6-II	917	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-titanium intermetallics + Molybdenum cermets	6-II	919	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-chromium alloys + + Titanium (di-)boride cermet	6-II	930	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Cermets (also see individual cermets) (cont.)																
Europium oxide + Iron-chromium alloy cermet . . .	6-II	-	-	-	-	-	-	-	-	-	786	-	-	-	-	-
Hafnium carbide + Zirconium cermet	6-II	-	-	-	-	-	-	-	-	-	852	-	-	-	-	-
Magnesium oxide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	788	-	-	-	-	-
Molybdenum (di-)silicide + + Copper cermets	6-II	923	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum-silicon-titanium cermet	6-II	930	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon carbide + Magnesium oxide + Nickel aluminide cermet	6-II	-	-	-	-	-	-	-	-	-	854	-	-	-	-	-
Silicon carbide + Silicon cermet	6-II	-	-	-	-	-	-	-	856	-	-	-	-	-	-	-
Silicon (di-)oxide + Aluminum cermet	6-II	-	-		-	-	-	-	-	-	790	-	-	-	-	-
Sodium fluoride + Beryllium ferride cermet	6-II	-	-	-	-	-	-	-	911	-	-	-	-	-	-	-
Strontium titanate + Cobalt cermet	6-II	-	-	-	-	-	-	-	792	-	-	-	-	-	-	-
Tantalum carbide + Iron cermet	6-II	858	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum carbide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	860	-	-	-	-	-
Thorium (di-)oxide + Tungsten cermet.	6-II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	794
Titanium carbide + Cobalt cermet	6-II	862	-	-	-	-	-	-	911	-	864	-	-	-	-	-
Titanium carbide + Molybdenum + Tungsten cermet. .	6-II	-	-	-	-	-	-	-	-	-	866	-	-	-	-	-
Titanium carbide + Nickel cermet	6-II	868	-	-	-	-	-	871	873	-	875-877	-	-	-	-	-
Titanium carbide + Niobium carbide + Nickel cermet . .	6-II	-	-	-	-	-	-	-	911	-	-	-	-	-	-	-
Titanium carbide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	879	-	-	-	-	-
Titanium nitride + Chromium + + Titanium cermet	6-II	-	-	-	-	-	-	-	-	-	909	-	-	-	-	-
Titanium (mon-)oxide + + Chromium-titanium alloys cermet	6-II	-	-	-	-	-	-	-	-	-	796	-	-	-	-	-
Titanium tungsten (di-)carbide + Cobalt cermet . . .	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
Titanium tungsten (di-)carbide + Tantalum cermet . .	6-II	-	-	-	-	-	-	-	-	-	883	-	-	-	-	-
Tungsten carbide + Chromium-cobalt alloys cermet	6-II	-	-	-	-	-	-	-	-	-	895	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Cermets (also see individual cermets) (cont.)																
Tungsten carbide + Cobalt cermet	6-II	-	-	-	-	-	-	-	889	-	897-905	-	-	-	-	-
Tungsten carbide + Nickel cermet	6-II	-	-	-	-	-	-	-	-	-	907	-	-	-	-	-
Uranium (mono-) carbide + + Molybdenum cermet . . .	6-II	-	-	-	-	-	-	-	-	-	891	-	-	-	-	-
Uranium (mono-) carbide + + Uranium cermet	6-II	-	-	-	-	-	-	-	-	-	893	-	-	-	-	-
Uranium (di-)oxide + + Chromium cermet	6-II	-	-	-	-	-	798	-	800	-	802	-	-	-	-	-
Uranium (di-)oxide + + Molybdenum cermet . . .	6-II	-	-	-	-	-	804	-	806	-	808	-	-	-	-	-
Uranium (di-)oxide + + Niobium cermet	6-II	-	-	-	-	-	810	-	812	-	-	-	-	-	-	-
Uranium (di-)oxide + Stainless steel cermet	6-II	-	-	-	-	-	814	-	816	-	818	-	-	-	-	-
Uranium (di-)oxide + + Zirconium cermets	6-II	820	-	-	-	-	-	-	822	-	824	-	-	-	-	-
Zirconium (di-)boride cermet	6-II	842	-	-	-	-	844	846	848	-	850	-	-	-	-	-
Zirconium (di-)oxide + + Titanium cermet	6-II	-	-	-	-	-	-	826	828	830	832	-	-	-	-	-
Zirconium (di-)oxide + + Yttrium oxide + Zirconium cermet	6-II	-	-	-	-	-	-	-	834	-	-	-	-	-	-	-
Zirconium (di-)oxide + + Zirconium cermet	6-II	-	-	-	-	-	-	-	-	836	838	-	-	-	-	840
Cesium chloride (CsCl)	5	-	-	-	-	-	-	315	-	-	-	-	-	-	-	-
Chemaco 342	6-II	-	-	-	-	-	-	-	-	-	948	-	-	-	-	-
Chemaco 343	6-II	-	-	-	-	-	-	-	-	-	948	-	-	-	-	-
Chemaco 344	6-II	-	-	-	-	-	-	-	-	-	948	-	-	-	-	-
Chemaco 345	6-II	-	-	-	-	-	-	-	-	-	948	-	-	-	-	-
Chemaco 346	6-II	-	-	-	-	-	-	-	-	-	948	-	-	-	-	-
Chemaco SPZ 325	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 326	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 327	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 327-MS	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 329	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 330	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 331	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chemaco SPZ 332	6-II	-	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Chloromethyoxetane, 3,3 bis- .	6-II	-	1076	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromalloy W-2 coating on molybdenum-titanium alloys .	6-II	-	-	-	-	-	-	-	-	-	-	-	1505-1509	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Chromium (Cr)	1	410	410	-	-	410	412	414	416	418	420	-	422-426	428-432	-	434
Chromium, electrolytic	1	-	-	-	-	-	412	-	416	-	420	-	-	-	-	-
Chromium + ΣX_i	2-II	873	-	-	-	873	875	-	877	-	-	-	-	-	-	-
Chromium + Aluminum + ΣX_i . .	2-II	-	-	-	-	-	-	855	-	-	-	-	-	-	-	-
Chromium + Iron	2-I	-	62	-	-	-	64	66	-	-	-	-	-	-	-	-
Chromium + Iron + ΣX_i	2-II	857	-	-	-	-	-	859	-	-	861	-	-	-	-	-
Chromium + Molybdenum . . .	2-I	-	-	-	-	-	-	-	-	-	68	-	-	-	-	-
Chromium + Molybdenum + ΣX_i .	2-II	863	-	-	-	-	-	-	-	-	865	-	-	-	-	-
Chromium + Nickel	2-I	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-
Chromium + Nickel + ΣX_i . . .	2-II	-	867	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium + Silicon	2-I	72	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium + Silicon + ΣX_i . . .	2-II	869	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium + Tungsten	2-I	74	-	-	-	-	-	-	-	-	76	-	-	-	-	-
Chromium + Tungsten + ΣX_i . .	2-II	871	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium alloys (special designations)																
Ferrochromium	2-II	-	-	-	-	-	-	859	-	-	-	-	-	-	-	-
Aluminothermic chromium .	2-II	-	-	-	-	-	-	859	-	-	-	-	-	-	-	-
Chromium aluminides																
CrAl	6-I	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
$CrAl_3$	6-I	-	-	-	-	-	-	-	-	-	5	-	-	-	-	-
Cr_3Al	6-I	-	3	-	-	-	-	-	-	-	5	-	-	-	-	-
Chromium beryllide ($CrBe_2$) . .	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium borides																
CrB	6-I	164	164	-	-	-	-	166	-	-	-	-	-	-	-	-
CrB_2	6-I	164	164	-	-	-	-	166	-	-	168	-	-	-	-	-
Cr_2B	6-I	-	164	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_3B_4	6-I	-	164	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_4B	6-I	-	164	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_5B_3	6-I	-	164	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (di-)boride + + Chromium-molybdenum intermetallic cermet	6-II	913	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (di-)boride + + Titanium (di-)boride	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (di-)boride + + Vanadium (di-)boride . . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium carbides																
CrC	5	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_3C_2	5	39	39	-	-	-	-	41	-	-	45	-	-	-	-	-
Cr_6C	5	-	-	-	-	-	-	43	-	-	-	-	-	-	-	-
Cr_5C_2	5	-	-	-	-	-	-	43	-	-	-	-	-	-	-	-
Cr_7C_3	5	-	39	-	-	-	-	43	-	-	-	-	47	-	-	-

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Chromium carbides (cont.)																
$Cr_{23}C_6$	5	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium carbide-cobalt blend on iron	6-II	-	-	-	-	-	-	-	-	-	-	1407	1409	-	-	-
Chromium-molybdenum silicides																
(Cr, Mo)Si_2	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
(Cr, Mo)$_3$Si	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-molybdenum-silicon cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-niobium intermetallics (Cr_2Nb)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium nitrides																
CrN	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_2N	5		621													
Chromium (sesqui-)oxide (Cr_2O_3)	4-I	-	-	-	-	-	130	132	-	-	134	-	136-138	140	-	-
Chromium (sesqui-)oxide + + Aluminum oxide	4-I	-	-	-	-	-	679	-	-	-	681	-	683	-	-	-
Chromium (sesqui-)oxide + + Molybdenum (di-)silicide . .	5	-	-	-	-	-	-	-	-	-	-	-	769	-	-	-
Chromium (sesqui-)oxide + + Nickel (mon-)oxide	4-I	-	-	-	-	-	685	-	-	-	-	-	-	-	-	-
Chromium (sesqui-)oxide + + Niobium (pent-)oxide	4-I	-	-	-	-	-	687	-	-	-	-	-	-	-	-	-
Chromium (sesqui-)oxide + + Titanium-chromium intermetallics	5	-	-	-	-	-	-	-	-	-	-	-	771-773	775	-	-
Chromium (sesqui-)oxide + + Yttrium oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	689	-	-	-
Chromium phosphides (CrP) . .	5	635	635	-	-	-	639	-	-	-	-	-	-	-	-	-
Chromium silicides																
CrSi	6-I	-	381	-	-	-	383	385	-	-	389	-	-	-	-	-
$CrSi_2$	6-I	-	381	-	-	-	383	385	387	-	389	-	-	-	-	-
Cr_3Si	6-I	-	381	-	-	-	-	385	-	-	389	-	391-393	395	-	-
Cr_3Si_2	6-I	-	-	-	-	-	-	-	-	-	389	-	-	-	-	-
Cr_5Si	6-I	-	381	-	-	-	-	-	-	-	-	-	-	-	-	-
Cr_5Si_3	6-I	-	-	-	-	-	-	385	-	-	-	-	-	-	-	-
Chromium silicide cermets . .	6-II	-	-	-	-	-	-	-	-	-	915	-	-	-	-	-
Chromium (di-)silicide + + Molybdenum (di-)silicide . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-silicon-titanium cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-tantalum intermetallics (Cr_2Ta_2)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Chromium-titanium intermetallics + Chromium (sesqui-)-oxide	5	-	-	-	-	-	-	-	-	-	926	-	928-930	932	-	-
Chromium-titanium intermetallics + Copper cermets	5	917	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium-titanium intermetallics + Molybdenum cermets . .	6-II	919	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium zirconate ($Cr_2O_3 \cdot ZrO_2$)	4-II	-	-	-	-	-	-	-	-	-	1508	-	-	-	-	-
Chromium-zirconium intermetallics (Cr_2Zr)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Chronin	2-I	-	-	-	-	-	-	-	-	-	70	-	-	-	-	-
Chrycote coating on copper. . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1499	-	-	-
Clad steel	6-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
Clinoenstatite	4-II	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-
Coatings																
Aluminide on niobium	6-II	-	-	-	-	-	-	-	-	-	-	-	1435-1437	1439	-	-
Aluminide on titanium. . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1447-1449	1451	-	-
Aluminized-silicone paint on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1497	-	-
Aluminum on mylar.	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1287	-	-
Aluminum oxide on AISI 446 .	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1349	-	-
Aluminum phosphate on nickel	6-II	-	-	-	-	-	-	-	-	-	-	-	1431	-	-	-
Barium titanate on niobium-zirconium alloys.	6-II	-	-	-	-	-	-	-	-	-	-	-	1371	-	-	-
Boron on molybdenum. . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1289	-	-	-
Boron on niobium-zirconium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	1291	-		-
Boron carbide on Inconel X .	6-II	-	-	-	-	-	-	-	-	-	-	-	1403	1405	-	-
Calcium titanate on niobium-zirconium alloys.	6-II	-	-	-	-	-	-	-	-	-	-	-	1371	-	-	-
Carbon on molybdenum . . .	6-II	-	-	-	-	-	-	-	-	-	-	1293	1295	-	-	-
Chromalloy W-2 on molybdenum-titanium alloys . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1505-1509	-	-	-
Chromium carbide-cobalt blend on iron	6-II	-	-	-	-	-	-	-	-	-	-	1407	1409	-	-	-
Chrycote on copper.	6-II	-	-	-	-	-	-	-	-	-	-	-	1499	-	-	-
Cobalt oxide on tantalum . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1373-1375	-	-	-
Copper on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1301	-	-
Dow-Corning XP-310 on Ti-75A (AMS 4901).	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1497	-	-

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Coatings (cont.)																
Durak MG on molybdenum-titanium alloy	6-II	-	-	-	-	-	-	-	-	-	-	-	1501-1503	-	-	-
Enamel on AISI 310	6-II	-	.	-	-	-	-	-	-	-	-	-	1515	-	-	-
Enamel on AISI 321	6-II	-	-	-	-	-	-	-	-	-	-	-	1513	-	-	-
Enamel on Inconel	6-II	-	-	-	-	-	1521	-	-	-	-	-	-	-	-	-
Gold on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1307	-	-
Gold on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	1303	1305	-	-
Graphite, pyrolytic, on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1297-1299	-	-	-
Hafnium (di-)oxide on tungsten	6-II	-	-	-	-	-	-	-	-	-	-	-	1377-1379	-	-	-
Hastelloy C on AISI 310 . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1337	-	-	-
Hastelloy X on AISI 310 . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1339	-	-	-
Iron(ic) oxide on stellite no. 25 (L-605)	6-II	-	-	-	-	-	-	-	-	-	-	-	1381-1383	-	-	-
Iron titanate on niobium-zirconium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	1395	-	-	-
Kennametal K-151A on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1491	-	-	-
Kennametal K-152B on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1493	-	-	-
Magnesium fluoride on quartz	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1425	1427	-
Molybdenum on iron	6-II	-	-	-	-	-	-	-	-	-	-	1309	1311	-	-	
NBS coating A-418 on Inconel	6-II	-	-	-	-	-	-	-	-	-	-	-	1361-1363	-	-	-
NBS coating A-418 on stainless steel	6-II	-	-	-	-	-	-	-	-	-	-	-	1365-1367		-	-
NBS coating N-143 on Inconel	6-II	-	-	-	-	-	-	-	-	-	-	-	1353-1355	-	-	-
NBS coating N-143 on stainless steel	6-II	-	-	-	-	-	-	-	-	-	-	-	1357-1359	-	-	-
Nickel aluminide on Inconel .	6-II	-	-	-	-	-	-	-	-	-	-	-	1453-1455	1457	-	-
Nickel chromite on niobium-zirconium alloys.	6-II	-	-	-	-	-	-	-	-	-	-	-	1397	-	-	-
Nickel-chromium alloys on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1333	1335	-	-
Niobium aluminide on niobium	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1459	-	-
Platinum on copper	6-II	-	-	-	-	-	-	-	-	-	-	-	1313	-	-	-
Platinum on quartz	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1317	1319	-
Platinum on stainless steel .	6-II	-	-	-	-	-	-	-	-	-	-	-	1315	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Coatings (cont.)																
Rokide A on AISI 446	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1351	-	-
Rokide C on titanium alloy Ti-6 Al-4 V	6-II	-	-	-	-	-	-	-	-	-	-	-	1345-1347	-	-	-
Silicide on molybdenum	6-II	-	-	-	-	-	-	-	-	-	-	-	1467-1469	1471	-	-
Silicide on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1473-1475	1477	-	-
Silicide on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	1479-1481	1483	-	-
Silicide on tungsten	6-II	-	-	-	-	-	-	-	-	-	-	-	1455-1457	1459	-	-
Silicon carbide on niobium-zirconium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	1415	-	-	-
Silicon carbide on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1411-1413	-	-	-
Silicon (mon-)oxide on aluminum	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1389	-	-
Silicon (di-)oxide on aluminum	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1391	-	-
Silicone on Inconel	6-II	-	-	-	-	-	1495	-	-	-	-	-	-	-	-	-
Silver on AISI 321	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1321	-	-
Silver on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1323	-	-
Silver sulfide on silver	6-II	-	-	-	-	-	-	-	-	-	-	1431	1433	-	-	-
Strontium titanate on AISI 319	6-II	-	-	-	-	-	-	-	-	-	-	-	1393	-	-	-
Tantalum aluminide on tantalum	6-II	-	-	-	-		-	-	-	-	-	-	1461-1463	1465	-	-
Tantalum carbide on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1417	1419	-	-
Titanium (di-)oxide and aluminum on molybdenum	6-II	-	-	-	-	-	-	-	-	-	-	-	1395	-	-	-
Tungsten on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1329	1331	-	-
Tungsten on iron	6-II	-	-	-	-	-	-	-	-	-	-	1325	1327	-	-	-
Tungsten-cobalt alloys on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1341	1343	-	-
Tungsten carbide on iron	6-II	-	-	-	-	-	-	-	-	-	-	1421	1422	-	-	-
Zirconium (di-)oxide on Inconel	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1397	-	-
Zirconium (di-)oxide on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1399	1401	-	-
Cobalt (Co)	1	436	436	-	-	-	435	440	442	-	444	445	448-450	-	-	-
Cobalt + Chromium + ΣX_i	2-II	579, 582	579	-	-	-	-	584	546-553	599	552-906	-	909-914	916	-	-
Cobalt + Copper + ΣX_i	2-II	-	519	-	-	-	520	-	-	-	-	-	-	-	-	-
Cobalt + Gold	2-I	-	-	-	-	-	78	-	-	-	-	-	-	-	-	-
Cobalt + Gold + ΣX_i	2-II	-	522	-	-	-	524	-		-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Cobalt + Iron	2-I	-	-	-	-	80	82	84	-	-	-	-	86	-	-	88
Cobalt + Iron + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	926-930	-	-	-	-	-
Cobalt + Manganese + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	932	-	-	-	-	-
Cobalt + Nickel	2-I	92	-	-	-	90	-	-	-	-	-	-	94	-	-	96
Cobalt + Nickel + ΣX_i	2-II	-	-	-	-	-	-	-	934	936	938	-	-	-	-	-
Cobalt + Palladium + ΣX_i . . .	2-II	-	940	-	-	-	942-944	-	-	-	-	-	-	-	-	-
Cobalt + Vanadium	2-I	-	-	-	-	-	-	-	-	-	98	-	-	-	-	-
Cobalt alloys (special designations)																
Hastelloy 25	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
Haynes 152	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
HE 1049	2-II	-	-	-	-	-	-	884	888	-	900	-	-	-	-	-
J-1570	2-II	-	-	-	-	-	-	-	934	-	938	-	-	-	-	-
Jessop G32	2-II	879	-	-	-	-	-	-	888	-	892	-	-	-	-	-
Lohm	2-I	-	-	-	-	-	-	-	138	-	-	-	-	-	-	-
MAR-M302	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
PWA-653-A	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
Rexalloy 33	2-II	-	-	-	-	-	-	-	-	-	906	-	-	-	-	-
S-816	2-II	-	-	-	-	-	-	-	888, 934	890, 936	896, 938	-	-	-	-	-
SM-302	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
Stellites (see Stellite)																
V-36	2-II	-	-	-	-	-	-	-	-	-	896	-	-	-	-	-
Vitallium	2-II	-	879	-	-	-	-	-	-	-	894	-	-	-	-	-
WI-52	2-II	-	-	-	-	-	-	-	388	-	-	-	-	-	-	-
X-40	2-II	-	-	-	-	-	-	-	888	-	-	-	-	-	-	-
X-63	2-II	-	-	-	-	-	-	-	888	-	-	-	-	-	-	-
Cobalt aluminates																
$CoO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	995	-	-	-	-	-
$Co_2O_3 \cdot Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	995	-	-	-	-	-
Cobalt aluminide (CoAl)	6-I	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-
Cobalt beryllide (CoBe)	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt blue glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1847	1849	1951	-
Cobalt (mono-)boride (CrB) . .	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt carbide (Co_3C)	5	-	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-chromium alloys + Titanium (di-)boride cermet .	6-II	-	930	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-chromium intermetallics (CoCr)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt ferrite ($CoO \cdot Fe_2O_3$). . .	4-II	-	-	-	-	-	1071	1073	-	-	-	-	-	-	-	-
Cobalt-lead silicate glass . . .	4-II	-	-	-	-	-	1735	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Cobalt-molybdenum intermetallics (CoMo)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-niobium intermetallics (Co_5Nb_2)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt oxides																
CoO	4-I	-	-	-	-	-	-	142	-	-	146	-	-	-	-	-
Co_3O_4	4-I	-	-	-	-	-	-	144	-	-	-	-	-	-	-	-
Cobalt oxide coated tantalum . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1373-1375	-	-	-
Cobalt(ous) oxide + Copper(ic) oxide	4-I	-	-	-	-	-	-	691	-	-	-	-	-	-	-	-
Cobalt(ous) oxide + Nickel (mon-)oxide	4-I	-	-	-	-	-	-	693	-	-	-	-	-	-	-	-
Cobalt (ortho-) phosphate ($3\ CoO \cdot P_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1169	-	-	-	-	-
Cobalt phosphide (Co_2P)	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt silicides																
CoSi	6-I	-	397	-	-	-	399	491	529	-	403	-	-	-	-	-
$CoSi_2$	6-I	-	397	-	-	-	-	-	-	-	-	-	-	-	-	-
$CoSi_3$	6-I	-	397	-	-	-	-	-	-	-	-	-	-	-	-	-
Co_2Si	6-I	-	397	-	-	-	-	-	-	-	-	-	-	-	-	-
Co_3Si	6-I	-	397	-	-	-	-	-	-	-	403	-	-	-	-	-
Cobalt-titanium intermetallics																
CoTi	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
$CoTi_2$	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-tungsten intermetallics (CoW)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt-zirconium intermetallics (Co_4Zr)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Coke	1	-	-	-	-	-	85	-	87	-	-	-	-	-	-	-
Coke, graphitized	1	105	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Composite systems																
Alumina bubbles - graphite fibers system	6-II	-	-	-	-	-	-	-	1279	-	-	-	-	-	-	-
Dexiglas paper - aluminum foil - graphite fiber system .	6-II	-	-	-	-	-	-	-	1283	-	-	-	-	-	-	-
Fiberfrax paper - tantalum shield - graphite fibers system	6-II	-	-	-	-	-	-	-	1285	-	-	-	-	-	-	-
Graphite fibers - tantalum shield system	6-II	-	-	-	-	-	-	-	1281	-	-	-	-	-	-	-
Concrete	5	-	-	-	-	-	-	-	1027	-	-	-	-	-	-	-
Conolon N-1 Laminate	6-II	-	-	-	-	-	-	-	-	-	1174	-	-	-	-	-
Container glasses	4-II	-	-	-	-	-	-	-	-	-	-	-	1833	1835	1837	-
Contracid	2-II	-	-	-	-	-	-	-	1261	-	-	-	-	-	-	-
Copolyvinyl chloride + Acetate .	6-II	-	-	-	-	-	-	-	-	-	950	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Copper (Cu)	1	452	452	452	452	452	454	456	458	460	462	464	466-470	472-477	-	479
Copper, commercial coalesced .	1	452	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper DS (British aircraft material spec.)	1	-	-	-	-	-	-	-	-	-	-	-	-	472	-	-
Copper, electrolytic.	1	452	452	-	-	-	-	456	-	-	462	-	466	472	-	-
Copper, electrolytic tough pitch (Fed. Spec. QQC-502)	1	452	-	-	-	-	-	456	458	-	462	464	468	474	-	-
Copper, electrolytic tough pitch (Fed. Spec. QQC-576)	1	-	-	-	-	-	-	456	458	-	462	464	468	474	-	-
Copper, OFHC	1	-	-	-	-	-	-	-	458	460	-	-	-	-	-	-
Copper, tellurium	2-I	-	-	-	-	-	-	-	-	-	152	-	-	-	-	-
Copper coated with chrycote . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1499	-	-	-
Copper coated with platinum coating	6-II	-	-	-	-	-	-	-	-	-	-	-	1313	-	-	-
Copper coating on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1301	-	-
Copper + Aluminum	2-I	100	-	-	-	-	102-104	106	108	-	110	-	-	-	-	-
Copper + Aluminum + ΣX_i . . .	2-II	-	-	-	-	-	946	-	948	-	950	952	954-958	960	-	-
Copper + Beryllium	2-I	-	-	-	-	-	-	112	-	-	-	-	-	-	-	-
Copper + Chromium	2-I	-	-	-	-	-	114	-	116	-	-	-	-	-	-	-
Copper + Chromium + ΣX_i . . .	2-II	-	-	-	-	-	962	-	964	-	-	-	-	-	-	-
Copper + Cobalt	2-I	-	-	-	-	-	-	-	118	-	-	-	-	-	-	-
Copper + Cobalt + ΣX_i	2-II	-	966	-	-	-	968	-	970-972	-	-	-	-	-	-	-
Copper + Gold																
$CuAu_3$	2-I	-	-	-	-	-	-	204	-	-	206	-	-	-	-	-
Cu_3Au	2-I	-	-	-	-	-	-	204	-	-	206	-	-	-	-	-
Copper + Iron	2-I	-	-	-	-	-	120	122	124	-	-	-	-	-	-	-
Copper + Iron + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	-	-	974	-	-	-
Copper + Lead	2-I	126	-	-	-	-	-	-	-	-	128	-	-	-	-	-
Copper + Lead + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	976	-	-	-	-	-
Copper + Manganese.	2-I	-	-	-	-	-	130	132	-	-	-	-	-	-	-	-
Copper + Manganese + ΣX_i . . .	2-II	-	-	-	-	-	978	-	980	-	-	-	-	-	-	-
Copper + Nickel	2-I	-	-	-	-	-	134	136	138	-	-	-	-	-	-	-
Copper + Nickel + ΣX_i	2-II	-	-	-	-	-	982	-	984-986	-	988	-	-	-	-	-
Copper + Palladium	2-I	-	-	-	-	-	140	-	142	-	-	-	-	-	-	-
Copper + Palladium + ΣX_i . . .	2-II	-	990	-	-	-	992	-	-	-	-	-	-	-	-	-
Copper + Platinum	2-I	-	-	-	-	-	144	-	-	-	-	-	-	-	-	-
Copper + Silicon	2-I	-	-	-	-	-	146	-	-	-	-	-	-	-	-	-
Copper + Silicon + ΣX_i.	2-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
Copper + Silver	2-I	-	-	-	-	-	-	-	-	-	148	-	-	-	-	-
Copper + Tellurium	2-I	150	-	-	-	-	-	-	-	-	152	-	-	-	-	-

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Copper + Tin	2-I	154	-	-	-	-	156	-	158	-	160	-	162	-	-	-
Copper + Tin + ΣX_i	2-II	-	-	-	-	-	-	-	996	-	998	-	-	-	-	-
Copper + Titanium	2-I	164	164	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Uranium	2-I	166	166	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Zinc	2-I	168	-	-	-	-	170	172	-	174	-	-	176-180	162	-	-
Copper + Zinc + ΣX_i	2-II	-	-	-	-	-	-	-	1000	-	1002-1004	-	-	-	-	-
Copper + Zirconium	2-I	184	-	-	-	-	186	-	188	-	-	-	-	-	-	-
Copper + Zirconium + ΣX_i . . .	2-II	-	-	-	-	-	1006	-	1008	-	-	-	-	-	-	-
Copper alloys (special designations)																
Admiralty nickel	2-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Aterite	2-II	-	-	-	-	-	-	-	-	-	1034	-	-	-	-	-
Manganin	2-II	-	-	-	-	-	978	-	-	-	-	-	-	-	-	-
Monels (see Monel)																
Ms-56	2-II	-	-	-	-	-	-	-	1000	-	-	-	-	-	-	-
Ms-77-22-2	2-II	-	-	-	-	-	-	-	1000	-	-	-	-	-	-	-
Navy "M"	2-II	-	-	-	-	-	-	-	996	-	-	-	-	-	-	-
Porosint	2-I	-	-	-	-	-	-	-	158	-	-	-	-	-	-	-
Tempaloy 836	2-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Tempaloy 841	2-II	-	-	-	-	-	-	-	-	-	950	-	-	-	-	-
Copper ferrites																
$CuO \cdot Fe_2O_3$	4-II	-	-	-	-	-	1075	1077	-	-	-	-	-	-	-	-
$Cu_xFe_{3-x}O_4$	4-II	-	-	-	-	-	-	1077	-	-	-	-	-	-	-	-
Copper indium telluride ($CuInTe_2$)	6-I	-	-	-	-	-	-	-	572	-	-	-	-	-	-	-
Copper oxide (CuO)	4-I	-	-	-	-	-	148	150	-	-	-	-	-	-	-	152
Copper silver indium tellurides ($Ag_xCu_{1-x}InTe_2$)	6-I	-	-	-	-	-	-	-	640	-	-	-	-	-	-	-
Cordierite	4-II	-	-	-	-	-	1298	1300	1302	-	1304-1308	-	-	-	-	-
Cordierite 202	4-II	-	-	-	-	-	-	-	1302	-	-	-	-	-	-	-
Cordierite, barium-	4-II	-	-	-	-	-	-	-	-	-	1217-1221	-	-	-	-	-
Cordierite, lead-	4-II	-	-	-	-	-	-	-	-	-	1252-1254	-	-	-	-	-
Cordierite, lead-barium	4-II	-	-	-	-	-	-	-	-	-	1256-1258	-	-	-	-	-
Cordierite bodies	4-II	-	-	-	-	-	-	-	-	-	1310	-	-	-	-	-
Corning 0080 glass	4-II	-	-	-	-	-	-	-	1795	1793	-	-	-	-	-	-
Corning 1723 glass	4-II	-	-	-	-	-	-	1675	-	1677	-	-	1679	1681	1683-1685	-
Corning 7740 glass	4-II	-	-	-	-	-	-	1697	-	1701	-	-	1705	1709	1711-1713	-
Corning 7900 glass	4-II	-	-	-	-	-	-	1655	-	1661	-	-	1665	1669	1671-1673	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Corning 7940 glass	4-II	-	-	-	-	-	-	1655	-	-	-	-	1665	1669	1671-1673	-
Corning 3325 glass	4-II	-	-	-	-	-	-	-	-	1687	-	-	-	-	-	-
Corning 8362 glass	4-II	-	-	-	-	-	-	-	-	1749	-	-	-	-	-	-
Corning 9752 glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1847	1849	1851	-
Corundum	4-I	-	-	-	-	-	-	8	-	-	22	-	-	-	-	-
Cresol resin	6-II	-	-	-	-	-	-	1004	-	-	-	-	-	-	-	-
Cristobalite	4-I	-	-	-	-	-	-	-	-	-	367	-	-	-	-	-
Crown glass	4-II	1693	1693	-	-	-	-	1697	-	-	1723	-	-	-	-	-
Crystolon-R	5	-	-	-	-	-	-	-	-	-	-	-	131, 135	-	-	-
Curium (Cm)	1	481	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D																
Dexiglas paper - aluminum foil - graphite fibers composite system	6-II	-	-	-	-	-	-	-	1283	-	-	-	-	-	-	-
Diall 50-01 resin	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diall 50-51 resin	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diall 50-52 resin	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diall 52-01 resin	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diall 52-20-30 resin.	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diallylphthalate, reinforced . .	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Diamond	1	392	392	-	-	392	-	394	396	-	398	-	-	400	-	-
Dihydroperfluorobutyl acrylate, 1,1-	6-II	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dow-Corning XP-310 on Ti-75A (AMS 4901)	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1497	-	-
Durak MG coating on molybdenum-titanium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	1501-1503	-	-	-
Duranickel 301	2-II	-	-	-	-	-	-	-	-	-	1117	-	-	-	-	-
Durchy	5	-	-	-	-	-	-	-	-	-	-	-	871	-	-	-
Dures 16274	6-II	-	-	-	-	-	982	-	-	-	-	-	-	-	-	-
Dures 16694	6-II	-	-	-	-	-	1111	-	-	-	-	-	-	-	-	-
Duroid 5600	6-II	1097	-	-	-	-	-	-	1099	-	-	-	-	-	-	-
Dynakon rod F	6-II	-	-	-	-	-	-	-	-	-	1109	-	-	-	-	-
Dynakon sheet A3A	6-II	-	-	-	-	-	-	-	-	-	1109	-	-	-	-	-
Dysprosia	4-I	154	154	-	-	-	-	156	-	-	158	-	-	-	-	-
Dysprosium (Dy)	1	483	483	483	483	483	485	-	-	-	-	-	-	-	-	487
Dysprosium + Tantalum + ΣX_i .	2-II	-	-	-	-	-	-	-	-	-	1010	-	-	-	-	-
Dysprosium aluminate ($Dy_2O_3 \cdot 2\,Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	997	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Dysprosium borides																
DyB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DyB_6	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dysprosium carbide (DyC_2) . .	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dysprosium-cobalt intermetallics		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$CyCo_2$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$DyCo_3$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dysprosium hydride (DyH_3) . .	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dysprosium niobate ($Dy_2O_3 \cdot Nb_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1123	-	-	-	-	-
Dysprosium oxide (Dy_2O_3) . . .	4-I	154	154	-	-	-	-	156	-	-	158	-	-	-	-	-
Dysprosium oxide + Cerium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	695	-	-	-	-	-
Dysprosium oxide + Uranium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	697	-	-	-	-	-
Dysprosium oxide + Zirconium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	699	-	-	-	-	-
Dysprosium silicide ($DySi_2$) . .	6-I	52[illegible]	524	-	-	-	527	-	-	-	-	-	-	-	-	-
Dysprosium sulfides																
DyS_2	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dy_2S_3	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Dy_5S_7	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
E																
Eastman Intran glasses	4-II	-	-	-	-	-	-	1853	-	-	-	-	-	-	-	-
Eccofoam	6-II	1084	-	-	-	-	-	-	1080	-	-	-	-	-	-	-
Elastomer, isocyanate polyester	6-II	960	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Electroconducting glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1839	1841	1843-1845	-
Electroconducting glass 547-26 .	4-II	-	-	-	-	-	-	-	-	-	-	-	1839	1841	1843-1845	-
Electroconducting glass LOF-81E-19778	4-II	-	-	-	-	-	-	-	-	-	-	-	1839	1841	1843-1845	-
Electroconducting glass LOF-PB-19195	4-II	-	-	-	-	-	-	-	-	-	-	-	1839	1841	1843-1845	-
Enamel on Inconel	6-II	-	-	-	-	-	1511	-	-	-	-	-	-	-	-	-
Enamel, rinsed-Mason black, on AISI 321	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1513	-	-
Enamel, spinel, coating on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1515	-	-	-
Enstatite	4-II	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-
Epoxide	6-II	1006	-	-	-	-	-	-	1010	-	1012	-	-	-	-	-
Epoxide, Hysol 6000-OP	6-II	1006	-	-	-	-	-	-	1010	1082	1012	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Epoxide, reinforced	6-II	-	-	-	-	-	-	1117	1120	1220	1122-1124	-	-	-	-	-
Epoxy, DER332	6-II	-	-	-	-	-	-	1008	-	-	-	-	-	-	-	-
Epoxy and phyophen copolymer resin, reinforced	6-II	-	-	-	-	-	-	-	1218	-	-	-	-	-	-	-
Epoxy resin	6-II	-	-	-	-	-	-	1008	-	-	-	-	-	-	-	-
Epoxy resin, reinforced	6-II	-	-	-	-	-	-	1115-1117	1120	1220	1122-1124	-	-	-	-	-
Erbia	4-I	160	-	-	-	-	-	162	-	-	164	-	166	-	-	-
Erbium (Er)	1	489	489	489	489	489	491	493	-	-	495	-	497	-	-	499
Erbium borides																
ErB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ErB_6	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium carbide ([illegible]$_2$)	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium-cobalt intermetallics ($ErCo_3$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium-gallium intermetallics ($ErGa_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium hydride (ErH_3)	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium-manganese intermetallics ($ErMn_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium-nickel intermetallics ($ErNi_3$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium oxide (Er_2O_3)	4-I	160	-	-	-	-	-	162	-	-	164	-	166	-	-	-
Erbium selenides																
ErSe	6-I	-	-	-	-	-	367	-	-	-	-	-	-	-	-	-
Er_2Se_3	6-I	-	-	-	-	-	367	-	-	-	-	-	-	-	-	-
Erbium-silver intermetallics (ErAg)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium sulfides																
ErS	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Er_2S_3	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Er_3S_7	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium tellurides (Er_2Te_3) . . .	6-I	-	-	-	-	-	638	-	-	-	-	-	-	-	-	-
Ethyl cellulose	6-II	-	-	-	-	-	-	-	-	-	348	-	-	-	-	-
Etruria Marl	4-I	-	-	-	-	-	-	-	-	-	802-812	-	-	-	-	-
Eucryptite	4-II	-	-	-	-	-	-	-	-	-	1270	-	-	-	-	-
Europium (Eu)	1	501	501	501	501	501	503	505	-	-	-	-	-	-	-	507
Europium (hexa-)boride (EuB_6) .	6-I	296	-	-	-	-	300	-	-	-	-	-	-	-	-	-
Europium oxide (Eu_2O_3)	4-I	168	168	-	-	-	-	170	-	-	172	-	-	-	-	-
Europium oxide + Iron-chromium alloy cermet	6-II	-	-	-	-	-	-	-	-	-	786	-	-	-	-	-
Europium silicide ($EuSi_2$) . . .	6-I	523	524	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Europium sulfides																
EuS	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EuS_2	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Eu_3S_4	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Evanohm	2-II	1119	-	-	-	-	1124	-	-	-	-	-	-	-	-	-
F																
Fabrics																
Fiber glass	6-II	-	-	-	-	-	-	-	-	1269	-	-	-	-	-	-
Graphite	6-II	-	-	-	-	-	-	-	-	1271	-	-	-	-	-	-
Nylon	6-II	-	-	-	-	-	-	-	-	1273	-	-	-	-	-	-
Organic fiber	6-II	-	-	-	-	-	-	-	-	1275	-	-	-	-	-	-
Silica	6-II	-	-	-	-	-	-	-	-	1277	-	-	-	-	-	-
Feldspars																
Barium	4-II	-	-	-	-	-	-	1205	-	-	1207	-	-	-	-	-
Calcium	4-II	-	-	-	-	-	-	-	-	-	1235	-	-	-	-	-
Lithium	4-II	-	-	-	-	-	-	-	1266	-	1270	-	-	-	-	-
Lithium-potassium	4-II	-	-	-	-	-	-	-	-	-	1283	-	-	-	-	-
Sodium	4-II	-	-	-	-	-	-	-	-	-	1326	-	-	-	-	-
Sodium-potassium	4-II	-	-	-	-	-	-	-	-	-	1330	-	-	-	-	-
Strontium	4-II	-	-	-	-	-	-	-	-	-	1334	-	-	-	-	-
Ferramic E	4-II	-	-	-	-	-	-	1093	-	-	-	-	-	-	-	-
Ferroferric oxide + Iron(ic) oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	715	-	-	-
Fiber cermets	6-II	928	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fiber glass fabrics	6-II	-	-	-	-	-	-	-	-	1269	-	-	-	-	-	-
Fiberfrax paper-tantalum shield-graphite fibers composite system	6-II	-	-	-	-	-	-	-	1285	-	-	-	-	-	-	-
Fiberite 4030-190	6-II	-	-	-	-	-	1103	-	-	-	-	-	-	-	-	-
Firebricks																
Alumina	4-I	-	-	-	-	-	613	-	621	-	-	-	-	-	-	-
ASTM group no. 16 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
ASTM group no. 20 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
ASTM group no. 23 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
ASTM group no. 26 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
ASTM group no. 28 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
ASTM group no. 30 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
Egyptian	4-I	-	-	-	-	-	-	-	798	800	-	-	-	-	-	-
Firebricks	4-I	-	-	-	-	-	-	-	798	789, 809	-	-	-	-	-	-
K-28 insulating	5	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
Siliceous	5	-	-	-	-	-	-	-	-	-	-	-	1043	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Flint container glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1799	1801	1729	-
Flint glass	4-II	-	-	-	-	-	-	1829	-	-	-	-	-	-	-	-
Fluorothene	6-II	1030	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
FM-5064 graphite-phenolic laminates	6-II	-	-	-	-	-	-	1140	-	-	-	-	-	-	-	-
Forsterite	4-II	1285	1285	-	-	-	1287	-	1291	-	-	-	-	-	-	-
Forsterite 243	4-II	1285	1285	-	-	-	-	-	-	-	-	-	-	-	-	-
Forsterite-stainless steel laminates	6-II	-	-	-	-	-	-	-	1221	-	-	-	-	-	-	-
Fortical 28227	6-II	-	-	-	-	-	-	-	-	-	944	-	-	-	-	-
Fortical 28238	6-II	-	-	-	-	-	-	-	-	-	944	-	-	-	-	-
Fresco FR0920	6-II	-	-	-	-	-	-	1214	-	-	-	-	-	-	-	-
FRLG 2502-1	6-II	-	-	-	-	-	-	-	-	1277	-	-	-	-	-	-
Furfural formaldehyde, wood flour filled	6-II	-	-	-	-	-	-	-	-	-	1000	-	-	-	-	-
G																
Gadolinia	4-I	174	174	-	-	-	-	176	176	-	160	-	162	-	-	-
Gadolinium (Gd)	1	509	509	509	509	509	511	-	-	-	513	-	-	-	-	-
Gadolinium + Tantalum	2-I	-	-	-	-	-	-	-	-	-	190	-	-	-	-	-
Gadolinium borides																
GdB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GdB_6	6-I	295	296	-	-	-	300	-	-	-	-	-	-	-	-	-
Gadolinium carbides																
GdC_2	5	294	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium-cobalt intermetallics																
GdCo	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCo_2$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCo_3$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCo_4$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCo_5$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2Co_3	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_3Co	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium-copper intermetallics																
GdCu	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCu_4$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdCu_5$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium ferrides																
$GdFe_3$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdFe_4$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GeFe_5$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2Fe_3	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Gadolinium ferrides (cont.)																
Gd_2Fe_{17}	6-II	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium (tri-) fluoride (GdF_3)	5	-	407	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium-gallium intermetallics ($GdGa_2$)	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium hydrides																
GdH_2	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GdH_3	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium-nickel intermetallics																
GdNi	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdNi_2$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdNi_3$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdNi_4$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$GdNi_5$	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2Ni_7	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2Ni_{17}	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_3Ni	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_3Ni_2	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium-osmium intermetallics (Gd_2Os_3)	6-I	655	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium oxide (Gd_2O_3) . . .	4-I	174	174	-	-	-	-	176	178	-	180	-	182	-	-	-
Gadolinium selenides																
GdSe	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2Se_3	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_3Se_4	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium silicides ($GdSi_2$) . .	6-I	323	-	-	-	-	527	-	-	-	-	-	-	-	-	-
Gadolinium-silver intermetallics (GdAg)	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium sulfides																
GdS_2	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gd_2S_3	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium tellurides																
Gd_2Te	6-I	-	-	-	-	-	639	-	-	-	-	-	-	-	-	-
Gd_2Te_3	6-I	-	-	-	-	-	639	-	-	-	-	-	-	-	-	-
Gadolinium-yttrium-cobalt intermetallics ($Gd_{1-x}Y_xCo_3$) .	6-I	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galena	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gallium antimonide (GaSb) . . .	6-I	-	-	-	-	-	51	53	-	-	-	-	-	688	-	-
Gallium arsenide (GaAs)	6-I	-	-	-	-	-	-	63	-	85	-	-	-	-	-	-
Gallium (sesqui-) oxide (Ga_2O_3) .	4-I	-	-	-	-	-	-	184	-	-	-	-	-	-	-	-
Gallium phosphide (GaP)	5	-	-	-	-	-	-	520	-	-	-	-	-	-	-	-
Gallium telluride (Ga_2Te_3)	6-I	-	-	-	-	-	-	574	-	-	-	-	-	-	-	-
Gehlenite	4-II	-	-	-	-	-	-	1233	-	-	1235	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
German Flake	1	-	-	-	-	-	53	-	-	-	-	-	-	-	-	-
. . . .	2-II	841	-	-	-	-	-	-	645	-	-	-	-	-	-	-
Germanium (Ge)	1	515	515	515	515	515	517	519	521	524	526	-	528-530	-	-	532
Germanium + Silicon	2-I	192	-	-	-	-	134	-	-	-	-	-	-	-	-	-
Germanium bismuth telluride ($Ge_{1-x}Bi_xTe$)	6-I	-	-	-	-	-	582	-	584	-	-	-	-	-	-	-
Germanium (di-)oxide (GeO_2) .	4-I	-	-	-	-	-	-	186	-	-	188	-	-	-	-	190
Germanium oxide glass	4-II	1637	-	-	-	-	-	1639	-	-	-	-	-	-	-	-
Germanium silicide (GeSi) . . .	6-I	-	-	-	-	-	-	405	-	-	-	-	-	-	-	-
Germanium telluride (GeTe) . .	6-I	-	-	-	-	-	576	-	578	-	-	-	-	-	-	580
Germanium telluride + Silver antimony telluride	6-I	-	-	-	-	-	715	-	-	-	-	-	-	-	-	-
Glasses (see individual glasses)																
Glass ceramics (see also pyroceram)	4-II	-	-	-	-	-	-	1587	1589	1591	-	-	1593-1599	1601	1603	-
Glucina	4-I	-	-	-	-	-	57	-	-	-	-	-	-	-	-	-
GMGA 5003 silicone	6-II	-	-	-	-	-	1070	-	-	-	-	-	-	-	-	-
Gold (Au)	1	534	534	-	-	534	536	538	540	-	542	544-546	548	550-552	-	554
Gold coating on titanium	6-II	-	-	-	-	-	-	-	-	-	-	-	1303	1305	-	-
Gold coating on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1307	-	-
Gold + Cadmium	2-I	196	196	196	-	-	198	-	-	-	-	-	-	-	-	200
Gold + Cobalt	2-I	-	-	-	-	-	202	-	-	-	-	-	-	-	-	-
Gold + Cobalt + ΣX_i	2-II	-	1012	-	-	-	1014	-	-	-	-	-	-	-	-	-
Gold + Copper	2-I	-	-	-	-	-	-	204	-	-	206	-	-	-	-	-
Gold + Copper + ΣX_i	..-II	-	-	-	-	-	1016	-	-	-	-	-	-	-	-	-
Gold + Iron	2-I	208	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold + Manganese	2-I	210	-	-	-	-	212	-	-	-	-	-	-	-	-	-
Gold + Nickel	2-I	214	-	-	-	-	-	216	-	-	-	-	-	-	-	-
Gold + Palladium	2-I	-	-	-	-	-	218	-	-	-	220	-	-	-	-	-
Gold + Palladium + ΣX_i	2-II	-	1018	-	-	-	1020	-	-	-	-	-	-	-	-	-
Gold + Platinum	2-I	-	-	-	-	-	222	-	-	-	-	-	-	-	-	-
Gold + Silver	2-I	-	-	-	-	-	-	-	-	-	224	-	226	-	-	228
Gold + Uranium	2-I	230	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold + Zinc	2-I	-	232	232	-	-	-	-	-	-	-	-	-	234	-	-
Gold alloy (special designations)																
Palau	2-I	-	-	-	-	-	-	-	-	-	250	-	-	-	-	-
Gold-manganese intermetallics (Au_2Mn)	6-I	-	-	-	-	-	645	-	-	-	-	-	-	-	-	-
Gold-titanium intermetallics (Au_4Ti)	6-I	-	653	-	-	-	-	-	-	-	-	-	-	-	-	-
Gold-zirconium intermetallics (Au-Zr)	6-I	-	653	-	-	-	-	-	-	-	-	-	-	-	-	-

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Goodyear foam-inplace	6-II	962	-	-	-	-	-	-	-	-	966	-	-	-	-	-
Graphites (Special designations):																
Grade 540	1	-	-	-	-	-	-	-	-	-	-	-	110-112	-	-	-
Grade 906G	1	-	-	-	-	-	371	-	-	-	114	-	-	-	-	-
Grade 512S	1	-	-	-	-	-	371	-	-	-	116	-	-	-	-	-
Grade 3474D	1	-	-	-	-	-	371	118	120	-	122	124	126-128	130	-	-
Grade 3499	1	-	-	-	-	-	372	-	-	-	131	-	-	-	-	-
Grade 7087	1	185	-	-	-	-	-	134	136	138	140	142	144-146	148	-	-
Grade 7130	1	-	-	-	-	-	-	-	-	-	-	-	150-152	-	-	-
Grade AGHT	1	-	-	-	-	-	-	-	154	-	-	-	-	-	-	-
Grade AGKSP	1	-	-	-	-	-	-	-	-	-	-	-	156	158	-	-
Grade AGKT	1	-	-	-	-	-	371	-	-	-	-	-	-	-	-	-
Grade AGOT	1	-	-	-	-	-	160	-	162	-	165	-	-	-	-	-
Grade AGOT-CSF	1	-	-	-	-	-	160	-	-	-	-	-	-	-	-	-
Grade AGOT-KC	1	-	-	-	-	-	160	-	-	-	-	-	-	-	-	-
Grade AGR	1	-	-	-	-	-	371	-	-	-	167	-	-	-	-	-
Grade AGX	1	-	-	-	-	-	-	-	-	-	169	-	171	-	-	-
Grade ATJ	1	183	-	-	-	-	371	175	177	-	179	-	182-188	190	-	-
Grade ATL-82	1	-	-	-	-	-	-	-	192	-	194	-	-	-	-	-
Grade AUC	1	-	-	-	-	-	-	-	-	-	-	-	196-198	200	-	-
Grade AWG	1	-	-	-	-	-	202	-	204	-	-	-	-	-	-	-
Grade CEP	1	-	-	-	-	-	-	-	-	-	206	-	-	-	-	-
Grade CFW	1	-	-	-	-	-	208	-	-	-	210	-	-	-	-	-
Grade CFZ	1	-	-	-	-	-	-	-	-	-	212	-	-	-	-	-
Grade CS	1	-	-	-	-	-	371	214	216	218	-	-	-	-	-	-
Grade CSF	1	-	-	-	-	-	-	-	220	-	222	-	-	-	-	-
Grade EH	1	-	-	-	-	-	371	-	-	-	224	-	-	-	-	-
Grade GBE	1	-	-	-	-	-	-	-	226	-	228	230	232-234	236	-	-
Grade GBH	1	185	-	-	-	-	-	238	240	-	242	244	246-248	250	-	-
Grade H1LM	1	-	-	-	-	-	-	-	-	-	-	-	252-254	-	-	-
Grade H3LM	1	-	-	-	-	-	372	-	-	-	256	-	258-260	-	-	-
Grade H4LM	1	-	-	-	-	-	-	-	262	-	264	-	-	-	-	-
Grade MH4LM	1	-	-	-	-	-	-	-	266	-	-	-	-	-	-	-
Grade NT-0605	1	-	-	-	-	-	372	-	-	-	343	-	-	-	-	-
Grade R-0093	1	-	-	-	-	-	268	-	270	-	-	-	-	-	-	-
Grade R-0025	1	-	-	-	-	-	-	-	272	-	-	-	-	-	-	-

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Graphites (special design.) (cont)																
Grade RT-0003	1	-	-	-	-	-	-	-	274	-	-	-	-	-	-	-
Grade RVA	1	-	-	-	-	-	-	-	-	-	276	-	-	-	-	-
Grade RVC	1	-	-	-	-	-	-	-	-	-	278	-	-	-	-	-
Grade RVD	1	-	-	-	-	-	-	-	-	-	280	-	-	-	-	-
Grade SA-25	1	-	-	-	-	-	-	-	282	-	-	-	-	-	-	-
Grade SPK	1	-	-	-	-	-	-	-	-	-	-	-	284	286	-	-
Grade TS	1	-	-	-	-	-	-	-	-	-	288	-	-	-	-	-
Nuclear grade TSP	1	-	-	-	-	-	-	-	290	-	-	-	-	-	-	-
Grade TSX	1	-	-	-	-	-	-	-	-	-	292	-	-	-	-	-
Grade W	1	-	-	-	-	-	-	-	294	-	296	-	-	-	-	-
Grade WSF	1	-	-	-	-	-	-	-	-	-	298	-	-	-	-	-
Grade ZT	1	-	-	-	-	-	300	-	302	-	-	-	-	-	-	-
Grade ZT-5001	1	-	-	-	-	-	-	-	302	-	-	-	-	-	-	-
Grade ZTA	1	-		-	-	-	-	-	-	-	305	-	-	-	-	-
Grade ZTB	1	-	-	-	-	-	-	-	-	-	307	-	-	-	-	-
Grade ZTC	1	-	-	-	-	-	-	-	-	-	309	-	-	-	-	-
Grade ZTD	1	-	-	-	-	-	-	-	-	-	311	-	-	-	-	-
Grade ZTE	1	-	-	-	-	-	-	-	-	-	313	-	-	-	-	-
Grade ZTF	1	-	-	-	-	-	-	-	-	-	315	-	-	-	-	-
Graphites, others																
Artificial grades	1	-	-	-	-	-	-	-	360	-	363	-	-	-	-	-
Carbon impregnated	1	-	-	-	-	-	-	-	358	-	-	-	-	-	-	-
Ceylon graphite	1	-	-	-	-	-	352	-	354	-	356	-	-	-	-	-
Coated with grade W graphite .	1	-	-	-	-	-	-	-	294	-	296	-	-	-	-	-
Coated with silicon carbide .	1	-	-	-	-	-	-	-	-	-	-	-	386	-	-	-
Cumberland graphite	1	-	-	-	-	-	352	-	354	-	-	-	-	-	-	-
Electrode	1	-	-	-	-	-	-	-	360	-	-	-	365	-	-	-
Experimental grades	1	-	-	-	-	-	337	-	339	343	349	-	-	-	-	-
Flake	1	-	-	-	-	-	-	-	-	-	369	-	-	-	-	-
Great Lakes base stock grades	1	-	-	-	-	-	-	-	-	-	381	-	-	-	-	-
Great Lakes end-cap grades	1	-	-	-	-	-	-	-	-	-	381	-	-	-	-	-
Great Lakes impervious grades	1	-	-	-	-	-	-	-	-	-	381	-	-	-	-	-
Hilger H. S. grade	1	-	-	-	-	-	352	-	354	-	-	-	-	-	-	-
Karbate	1	-	-	-	-	-	-	-	358	-	-	-	-	-	-	-
Lampblack-base	1	-	-	-	-	-	-	-	367	-	-	-	-	-	-	-
Natural graphite-base	1	-	-	-	-	-	352	-	354	-	-	-	-	-	-	-
Pyrolytic	1	-	-	-	-	-	-	-	317	-	319	-	325-331	333-335	-	-
Pyrolytic coating on tantalum .	6-II	-	-	-	-	-	-	-	-	-	-	-	573-575	-	-	-
Pyrolytic, nucleated and regenerative	1	-		-	-	-	-	-	-	-	319	-	-	-	-	-
Silicon carbide bonded . . .	1	-	-	-	-	-	-	-	-	-	-	-	386	-	-	-

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Graphites, others (cont.)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unspecified grades	1	105	105	-	-	105	371	375	377	379	383	-	386-388	-	-	390
Graphite + Silicon carbide . . .	5	-	-	-	-	-	-	737	-	-	-	-	-	-	-	-
Graphite + Thorium (di-)oxide .	5	-	-	-	-	-	-	-	739	-	-	-	-	-	-	-
Graphite + Uranium (di-)carbide	5	-	-	-	-	-	-	-	743	-	-	-	-	-	-	-
Graphite + Uranium (di-)oxide .	5	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-
Graphite + Zirconium (pyro-)-carbide	5	-	-	-	-	-	-	-	-	-	745	-	-	-	-	-
Graphite fabric	6-II	-	-	-	-	-	-	-	-	1271	-	-	-	-	-	-
Graphite cloth laminates																
PT-0110	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
PT-0111	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
PT-0113	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
PT-0114	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
PT-0154	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
PT-0156	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
Graphite fibers - tantalum shield composite system	6-II	-	-	-	-	-	-	-	1281	-	-	-	-	-	-	-
Graphite-phenolic laminate FM-5064	6-II	-	-	-	-	-	-	1140	-	-	-	-	-	-	-	-
Gray cast iron	3	-	-	-	-	-	-	-	29-33	-	39	-	-	-	-	-
Gray cast iron, ferritic base . .	3	-	-	-	-	-	-	-	33	-	-	-	-	-	-	-
Gray cast iron, pearlitic base .	3	-	-	-	-	-	-	-	31	-	-	-	-	-	-	-
H																
Hafnia	4-I	192	192	-	-	-	194	196	198	-	200	-	202	-	-	204
Hafnium (Hf)	1	556	556	-	-	-	558	560	-	-	562	-	-	-	-	-
Hafnium + Zirconium	2-I	236	236	-	-	-	238	240	242	-	244	-	-	-	-	246
Hafnium antimonide (HfSb) . . .	6-I	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-
Hafnium beryllide (Hf_2Be_{21}) . .	6-I	-	-	-	-	-	-	98	-	-	100	-	-	-	-	-
Hafnium (di-)boride (HfB_2) . .	6-I	170	170	-	-	-	172	174	176	-	178	-	180	-	-	-
Hafnium carbide (HfC).	5	49	49	-	-	-	51	53	55	57	59	-	61	-	-	-
Hafnium carbide + Zirconium cermet	6-II	-	-	-	-	-	-	-	-	-	852	-	-	-	-	-
Hafnium-chromium intermetallics ($HfCr_2$)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium-cobalt intermetallics ($HfCo_2$)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium ferrides ($HfFe_2$). . . .	6-I	-	306	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium fluoride (HfF_4)	5	-	-	-	-	-	-	367	-	-	-	-	-	-	-	-
Hafnium germanide (HfGe) . . .	6-I	-	-	-	-	-	325	-	-	-	-	-	-	-	-	-
Hafnium-manganese intermetallics ($HfMn_2$)	6-I	-	683	-	-	-	-	-	-	-	-	-	-	-	-	-

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Hafnium-molybdenum intermetallics ($HfMo_2$)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium-nickel intermetallics ($HfNi_3$)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium nitride (HfN)	5	517	517	-	-	-	519	521	523	-	525	-	527-529	-	-	531
Hafnium (di-)oxide (HfO_2) . . .	4-I	192	192	-	-	-	194	196	198	-	200	-	202	-	-	204
Hafnium (di-)oxide coating on tungsten	6-II	-	-	-	-	-	-	-	-	-	-	-	1377-1379	-	-	-
Hafnium (di-)oxide + ΣX_i . . .	4-I	-	-	-	-	-	-	-	-	-	711	-	-	-	-	-
Hafnium (di-)oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	-	-	701	-	-	-	-	-
Hafnium (di-)oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	-	-	703	-	-	-	-	-
Hafnium (di-)oxide + Tantalum (pent-)oxide	4-I	-	-	-	-	-	-	-	-	-	705	-	-	-	-	-
Hafnium (di-)oxide + Titanium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	707	-	-	-	-	-
Hafnium (di-)oxide + Titanium (di-)oxide + Zirconium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	709	-	-	-	-	-
Hafnium selenide (HfSe)	6-I	-	-	-	-	-	331	-	-	-	-	-	-	-	-	-
Hafnium silicate ($HfO_2 \cdot SiO_2$) . .	4-II	-	-	-	-	-	-	-	-	-	1241	-	-	-	-	-
Hafnium silicides																
HfSi	6-I	-	524	-	-	-	-	-	-	-	-	-	-	-	-	-
$HfSi_2$	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium tellurides (HfTe) . . .	6-I	-	-	-	-	-	638	-	-	-	-	-	-	-	-	-
Hafnium-vanadium intermetallics (HfV_2)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnon	4-II	-	-	-	-	-	-	-	-	-	1241	-	-	-	-	-
Hamilton standard foam-inplace.	6-II	962	-	-	-	-	-	-	-	-	966	-	-	-	-	-
Hastelloy 25	2-II	-	-	-	-	-	-	-	-	-	898	-	-	-	-	-
Hastelloy 500	2-II	-	-	-	-	-	-	-	-	-	1154	-	-	-	-	-
Hastelloy A	2-II	-	-	-	-	-	-	-	1261	-	-	-	-	-	-	-
Hastelloy B	2-II	1277	1275	-	-	-	-	1273	1281	-	1287	1289	1293-1295	1297	-	-
Hastelloy C	2-II	1119	-	-	-	-	-	1130	1126	-	1166	-	-	-	-	-
Hastelloy C (AMS-5530)	2-II	1277	-	-	-	-	-	-	1281	-	1283	1289	1291-1295	1297	-	-
Hastelloy C (AMS-5530C) . . .	2-II	-	-	-	-	-	-	-	-	-	-	1289	1293	1297	-	-
Hastelloy C coating on AISI 310 .	6-II	-	-	-	-	-	-	-	-	-	-	-	1337	-	-	-
Hastelloy D	2-II	-	-	-	-	-	-	-	-	-	1301	-	-	-	-	-
Hastelloy F	2-II	-	-	-	-	-	-	-	-	-	1164	-	-	-	-	-
Hastelloy N	2-II	1277	-	-	-	-	-	-	1281	-	1283	-	-	-	-	-
Hastelloy R-235	2-II	1122	-	-	-	-	-	1128	1136-1138	-	1161	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Hastelloy X	2-II	1119, 1257	-	-	-	-	-	-	1134, 1261	-	1164	-	1172, 1189	1203	-	-
Hastelloy X coating on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1339	-	-	-
Hematite	4-I	-	-	-	-	-	214	215	-	-	22?	-	-	224	-	-
Hidurel 6	2-II	-	-	-	-	-	962	-	964	-	-	-	-	-	-	-
Holmia	4-I	-	-	-	-	-	-	206	-	-	208	-	-	-	-	-
Holmium (Ho)	1	564	564	564	564	564	566	-	-	-	-	-	-	-	-	-
Holmium borides																
HoB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HoB_6	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium carbides																
HoC_2	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ho_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium-cobalt intermetallics																
$HoCo_2$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$HoCo_5$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium ferrides																
$HoFe_2$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$HoFe_5$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium-gallium intermetallics ($HoGa_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium-manganese intermetallics																
$HoMn_2$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$HoMn_5$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium-nickel intermetallics																
$HoNi_2$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$HoNi_5$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Holmium oxide (Ho_2O_3)	4-I	-	-	-	-	-	-	206	-	-	208	-	-	-	-	-
Honeycombs																
17-7PH stainless steel skin and core	6-II	-	-	-	-	-	-	1236	1230	-	1234	-	-	-	-	-
2024 T-3 aluminum alloy skin and core	6-II	-	-	-	-	-	-	1236	1230	-	1232	-	-	-	-	-
2024 T-3 aluminum alloy skin and alkyd isocyanate foam core	6-II	-	-	-	-	-	-	1236	1239	-	1243	-	-	-	-	-
2024 T-3 aluminum alloy skin and phenolic core	6-II	-	-	-	-	-	-	1236	1239	-	1241	-	-	-	-	-
Metal skin and metal core	6-II	-	-	-	-	-	-	1236	1230	-	1232-1234	-	-	-	-	-
Plastic and metal composites	6-II	-	-	-	-	-	-	1236	1239	-	1241-1245	-	-	-	-	-
Plastic skin and plastic core	6-II	-	-	-	-	-	-	-	1247-1253	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Honeycombs (cont.)																
Polyester P-43 resin skin and 2024 T-3 aluminum alloy core	6-II	-	-	-	-	-	-	1236	1239	-	1245	-	-	-	-	-
Polyester resin no. P-43 skin and polyester honeycomb core	6-II	-	-	-	-	-	-	1236	-	-	-	-	-	-	-	-
Polyester resin skin and epoxy resin core.	6-II	-	-	-	-	-	-	-	1247	-	-	-	-	-	-	-
Polyester resin skin and phenolic resin core	6-II	-	-	-	-	-	-	-	1247	-	-	-	-	-	-	..
Polyester Vibrin 135 and 181 fabric faces and phenolic core	6-II	-	-	-	-	-	-	1236	-	-	-	-	-	-	-	-
TAC polyester Vibrin 135 and 181 fabric skin and alkyd isocyanate foam core. . . .	6-II	-	-	-	-	-	-	-	-	-	1249	-	-	-	-	-
Reinforced polyester skin and polyester core	6-II	-	-	-	-	-	-	-	-	-	1253	-	-	-	-	-
Hysol 6000-CP epoxide	6-II	1006	-	-	-	-	-	-	1010	1082	1012	-	-	-	-	-
I																
Igelit-PCU	6-II	-	-	-	-	-	-	1078	1086	1082	-	-	-	-	-	-
Ilmenite	4-II	-	-	-	-	-	1427	1429	-	-	1431	-	-	-	-	-
Incoloy	3	-	-	-	-	-	-	383	-	-	-	-	-	-	-	-
Incoloy 713C	2-II	-	-	-	-	-	-	1126	1140	-	1152	-	-	-	-	-
Incoloy 800	3	-	-	-	-	-	-	-	-	-	405	-	-	-	-	-
Incoloy 801	3	-	-	-	-	-	-	-	-	-	405	-	..	-	-	-
Incoloy 804	2-II	-	-	-	-	-	-	-	-	-	1164	-	-	-	-	-
Incoloy 825	2-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
Incoloy 901	2-II	-	-	-	-	-	-	1259	1261	-	-	-	-	-	-	-
Incoloy T	3	-	-	-	-	-	-	-	-	-	405	-	-	-	-	-
Inconel	2-II	1119	1119	-	-	-	1124	1128	1140, 1144, 1145	1148	1158, 1161	-	1172, 1177, 1191	-	-	-
Inconel coated with enamel . . .	6-II	-	-	-	-	-	1151	-	-	-	-	-	-	-	-	-
Inconel coated with NBS coating A-418	6-II	-	-	-	-	-	-	-	-	-	-	-	1361-1363	-	-	-
Inconel coated with NBS coating N-143	6-II	-	-	-	-	-	-	-	-	-	-	-	1353-1355	-	-	-
Inconel coated with nickel aluminides	6-II	-	-	-	-	-	-	-	-	-	-	-	1453-1455	1457	-	-
Inconel coated with silicone . .	6-II	-	-	-	-	-	1495	-	-	-	-	-	-	-	-	-
Inconel coated with zirconium (di-)oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1397	-	-

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Inconel 600	2-II	1219, 1307	-	-	-	-	-	-	1223, 1313	-	1158	-	-	-	-	-
Inconel 604	2-II	-	-	-	-	-	-	-	-	-	1158	-	-	-	-	-
Inconel 625	2-II	-	-	-	-	-	-	-	-	-	1166	-	-	-	-	-
Inconel 700	2-II	-	-	-	-	-	-	-	1223	-	1227	-	-	-	-	-
Inconel 702	2-II	-	1119	-	-	-	-	1128	1144	-	1152	-	1193	1205	-	-
Inconel 718	2-II	-	-	-	-	-	-	-	-	-	1164	-	-	-	-	-
Inconel 721	2-II	-	-	-	-	-	-	-	-	-	1158	-	-	-	-	-
Inconel 722	2-II	-	-	-	-	-	-	-	-	-	1158	-	-	-	-	-
Inconel B	2-II	-	-	-	-	-	-	-	-	-	-	-	1174	-	-	-
Inconel M	2-II	-	-	-	-	-	-	-	-	-	1158	-	-	-	-	-
Inconel W	2-II	-	-	-	-	-	-	-	-	-	1158	-	-	-	-	-
Inconel X	2-II	1119	1119	-	-	-	1124	1128	1140	1148	1158	-	1172, 1177, 1186, 1195	1207	-	-
Inconel X coated with boron carbide	6-II	-	-	-	-	-	-	-	-	-	-	-	1403	1405	-	-
Inconel X coated with nickel-chromium alloy	6-II	-	-	-	-	-	-	-	-	-	-	-	1333	1335	-	-
Inconel X coated with tantalum carbide	6-II	-	-	-	-	-	-	-	-	-	-	-	1417	1419	-	-
Inconel X coated with tungsten .	6-II	-	-	-	-	-	-	-	-	-	-	-	1329	1331	-	-
Inconel X coated with tungsten-cobalt alloy	6-II	-	-	-	-	-	-	-	-	-	-	-	1341	1343	-	-
Inconel X coated with zirconium (di-)oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	1399	1401	-	-
Inconel X 750	2-II	1122	-	-	-	-	-	-	1140	-	1158	-	-	-	-	-
Index rod (gas baked coke) . . .	1	-	-	-	-	-	85	-	87	-	-	-	-	-	-	-
Indium antimonide (InSb). . . .	6-I	-	-	-	-	-	57	59	61	63	65	-	-	-	-	-
Indium arsenide (InAs)	6-I	-	-	-	-	-	87	89	91	-	-	-	-	-	-	-
Indium bismuth selenide ($InBiSe_3$)	6-I	-	-	-	-	-	335	-	-	-	-	-	-	-	-	-
Indium (sesqui-)oxide (In_2O_3). .	4-I	-	-	-	-	-	-	-	-	-	210	-	-	-	-	-
Indium phosphide (InP)	5	-	-	-	-	-	631	633	-	-	-	-	-	-	-	-
Indium telluride (In_2Te_3)	6-I	-	-	-	-	-	586	-	588	-	-	-	-	-	-	-
Inquartation silver	1	-	-	-	-	-	-	904	-	-	-	-	-	-	-	-
Insulating bricks (see bricks)																
Insulating firebricks (see firebricks)																
Insurok C-T-601	6-II	1128	-	-	-	-	-	1142	-	-	-	-	-	-	-	-
Insurok XXX-T-640	6-II	1128	-	-	-	-	-	1142	-	-	-	-	-	-	-	-
Intermetallics (see each individual intermetallics)																
Inverse spinel	4-I	-	-	-	-	-	-	691-693	-	-		-	-	-	-	-
Iodide titanium	1	-	993	-	-	-	995	999	1001	-	1005	-	-	-	-	1017

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Iodide zirconium	1	-	1099	-	-	-	1102	1104	1106	-	1111	-	-	-	-	-
Iridium (Ir)	1	568	568	-	-	568	570	572	574	-	-	-	576	-	-	-
Iridium + Rhodium	2-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	248
Iridium (tri-) silicide ($IrSi_3$) . .	6-I	-	-	-	-	-	407	-	-	-	-	-	-	-	-	-
Iron (Fe)	1	578	578	578	-	578	581	583	585	587	589	592	594-600	602	-	604
Iron, Armco	1	578	-	-	-	-	581	583	585	587	569	592	594, 598	602	-	-
Iron, electrolytic	1	-	578	-	-	578	581	583	-	-	589	-	-	-	-	604
Iron, Svea	1	-	-	-	-	-	-	-	585	-	-	-	-	-	-	-
Iron coated with chromium carbide - cobalt blend.	6-II	-	-	-	-	-	-	-	-	-	-	1407	1409	-	-	-
Iron coated with molybdenum . .	6-II	-	-	-	-	-	-	-	-	-	-	1309	1311	-	-	-
Iron coated with tungsten. . . .	6-II	-	-	-	-	-	-	-	-	-	-	1325	1327	-	-	-
Iron coated with tungsten carbide	6-II	-	-	-	-	-	-	-	-	-	-	1421	1423	-	-	-
Iron + ΣX_i	3	461	-	-	-	-	463	-	465	-	-	-	-	-	-	-
Iron + Aluminum + ΣX_i	3	45	-	-	-	-	47-51	-	-	-	-	-	-	-	-	-
Iron + Carbon + ΣX_i ($C \leq 2.00$) .	3	-	-	-	-	3	5	7-10	-	12-14	16-20	-	-	-	-	22
Iron + Carbon + ΣX_i ($C > 2.00$) .	3	27	-	-	-	-	-	-	29-37	-	39-41	-	-	-	-	-
Iron + Chromium + ΣX_i	3	55	53	-	-	-	57-63	65-77	79-83	85-94	96-118	120	122-134	136-138	-	-
Iron + Chromium + Nickel + + ΣX_i	3	[illegible]	140-141	-	-	-	147-153	155-164	166-180	182-193	195-227	229-231	233-272	274-286	-	-
Iron + Cobalt + ΣX_i	3	-	-	-	-	-	288-290	292-294	296	298	300	-	-	302	-	-
Iron + Copper + ΣX_i	3	-	-	-	-	-	304	306	308	-	-	-	-	-	-	-
Iron + Manganese + ΣX_i	3	310	-	-	-	-	312-314	316-323	325-327	329-333	335-343	-	345-347	349	-	-
Iron + Molybdenum + ΣX_i . . .	3	-	-	-	-	-	-	-	351	-	353	-	-	-	-	-
Iron + Nickel + ΣX_i	3	-	-	-	-	-	355	357-359	361-363	365	367-377	-	-	-	-	-
Iron + Nickel + Chromium + + ΣX_i	3	379	-	-	-	-	381	383	385-393	395-397	399-407	-	409-411	413	-	-
Iron + Platinum + ΣX_i	3	-	-	-	-	-	-	-	-	-	415	-	-	-	-	-
Iron + Silicon + ΣX_i	3	-	-	-	-	-	417-419	421-425	427-437	-	429-442	-	-	-	-	-
Iron + Tellurium + ΣX_i	3	-	-	-	-	-	-	446	-	-	-	-	-	-	-	-
Iron + Titanium + ΣX_i	3	-	-	-	-	-	-	448	-	-	-	-	-	-	-	-
Iron + Tungsten + ΣX_i	3	-	-	-	-	-	-	-	450	-	452	-	454	-	-	-
Iron + Vanadium + ΣX_i	3	-	-	-	-	-	456-458	-	-	-	-	-	-	-	-	-
Iron alloys (see cast irons and steels for special design.)																

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Iron aluminates																
$FeO \cdot Al_2O_3$	4-II	-	-	-	-	-	-	999	-	-	-	-	-	-	-	-
$Fe_2O_3 \cdot 2\,Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	1001	-	-	-	-	-
Iron beryllide ($FeBe_2$)	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron borides																
FeB	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe_2B	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron carbide (Fe_3C)	5	63	63	-	-	-	-	65	-	-	-	-	-	-	-	-
Iron chromites																
$FeO \cdot Cr_2O_3$	4-II	-	-	-	-	-	-	1051	-	-	1053	-	-	-	-	-
$Fe_2O_3 \cdot 2\,Cr_2O_3$	4-II	-	-	-	-	-	-	-	-	-	1053	-	-	-	-	-
Iron cobaltite ($FeO \cdot Co_2O_3$)	4-II	-	-	-	-	-	-	1065	-	-	-	-	-	-	-	-
Iron lead silicate glass	4-II	-	-	-	-	-	1737	-	-	-	-	-	-	-	-	-
Iron-niobium intermetallics (Fe_2Nb_3)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron nitride (Fe_4N)	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron oxides																
FeO	4-I	-	-	-	-	-	-	216	-	-	222	-	-	-	-	-
Fe_2O_3	4-I	-	-	-	-	-	214	218	-	-	222	-	-	224	-	-
Fe_3O_4	4-I	212	212	-	-	-	-	220	-	-	-	-	-	-	-	-
Iron(ic) oxide coating on Haynes alloy no. 25 (L-605)	6-II	-	-	-	-	-	-	-	-	-	-	-	1381-1383	-	-	-
Iron(ic) oxide + Aluminum oxide	4-I	-	-	-	-	-	-	-	-	-	713	-	-	-	-	-
Iron(ic) oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	-	-	717	-	-	-	-	-
Iron(ic) oxide + Silicon (di-)oxide	4-I	-	-	-	-	-	-	719	-	-	-	-	-	-	-	-
Iron(ous) oxide + ΣX_i	4-I	-	-	-	-	-	-	-	-	-	721	-	-	-	-	-
Iron(ous, ic) oxide + Iron(ic) oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	715	-	-	-
Iron phosphites																
Fe_2P	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe_3P	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron selenides																
FeSe	6-I	-	-	-	-	-	-	335	-	-	-	-	-	-	-	-
$FeSe_2$	6-I	-	-	-	-	-	-	335	-	-	-	-	-	-	-	-
Fe_3Se_4	6-I	-	-	-	-	-	-	335	-	-	-	-	-	-	-	-
Fe_7Se_8	6-I	-	-	-	-	-	-	335	-	-	-	-	-	-	-	-
Iron (ortho-)silicate ($2\,FeO \cdot SiO_2$)	4-II	-	-	-	-	-	-	1243	-	-	1245	-	-	-	-	-
Iron silicides																
FeSi	6-I	-	409	-	-	-	411	-	-	-	413	-	-	-	-	-
$FeSi_2$	6-I	-	409	-	-	-	-	-	-	-	413	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Iron silicides (cont.)																
Fe_3Si	6-I	-	409	-	-	-	-	-	-	-	413	-	-	-	-	-
Fe_3Si_2	5-I	-	409	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron sulfides																
FeS	5	-	-	-	-	-	-	650	-	-	-	-	-	-	-	-
FeS_2	5	-	-	-	-	-	-	680	-	-	-	-	-	682	-	-
Iron tellurides																
FeTe	6-I	-	-	-		-	-	590	-	-	-	-	-	-	-	-
$FeTe_2$	6-I	-	-	-	-	-	-	530	-	-	592	-	-	-	-	-
Iron titanate ($FeO \cdot TiO_2$)	4-II	-	1425	1425	-	-	1427	1429	-	-	1431	-	-	-	-	-
Iron titanate coating on niobium-zirconium alloys	6-II	-	-	-	-	-	-	-	-	-	-	-	1385	-	-	-
Iron-zirconium intermetallics																
Fe_2Zr	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Fe_3Zr	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Isobutylene and isoprene copolymer	5-II	-	-	-	-	-	-	-	-	632	-		-	-	-	-
Isocyanate polyester elastomer .	6-II	960	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Is foam	6-II	962	-	-	-	-	-	-	-	-	966	-	-	-	-	-
K																
Kel-F	6-II	1030	-	-	-	-	-	-	1037	-	1045	-	-	-	-	-
Kennametals																
3047	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
3109	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
3406	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
3411	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
K 1	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
K2S	5-II	-	-	-	-	-	-	-	859	-	885	-	-	-	-	-
K3H	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
K4H	6-II	-	-	-	-	-	-	-	-	-	885	-	-	-	-	-
K5H	6-II	-	-	-	-	-	-	-	-	-	885	-	-	-	-	-
K6	6-II	-	-	-	-	-	-	-	889	-	934	-	-	-	-	-
K7H	6-II	-	-	-	-	-	-	-	-	-	865	-	-	-	-	-
K8	6-II	-	-	-	-	-	-	-	-	-	897	-	-	-	-	-
K9	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
K10	2-I	-	-	-	-	-	-	-	-	-	565	-	-	-	-	-
K11	6-II	-	-	-	-	-	-	-	-	-	897	-	-	-	-	-
K21	6-II	-	-	-	-	-	-	-	-	-	883	-	-	-	-	-
K45	6-II	-	-	-	-	-	-	-	-	-	885	-	-	-	-	-
K65	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
K81	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Kennametals (cont.)																
K82	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
K84	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
K86	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
K90	6-II	-	-	-	-	-	-	-	-	-	903	-	-	-	-	-
K91	6-II	-	-	-	-	-	-	-	-	-	903	-	-	-	-	-
K92	6-II	-	-	-	-	-	-	-	-	-	903	-	-	-	-	-
K94	6-II	-	-	-	-	-	-	-	-	-	901	-	-	-	-	-
K95	6-II	-	-	-	-	-	-	-	-	-	899	-	-	-	-	-
K96	6-II	-	-	-	-	-	-	-	-	-	899	-	-	-	-	-
K138	6-II	136	-	-	-	-	-	-	-	-	864	-	-	-	-	-
K138A	6-II	136	-	-	-	-	-	-	-	-	864	-	-	-	-	-
K150A	6-II	-	-	-	-	-	-	-	-	-	875	-	-	-	-	-
K151	6-II	-	-	-	-	-	-	-	-	-	875	-	-	-	-	-
K151A	6-II	-	-	-	-	-	-	-	-	-	875	-	-	-	-	-
K151B	6-II	-	-	-	-	-	-	-	-	-	877	-	-	-	-	-
K152B	6-II	142	-	-	-	-	-	-	-	-	877	-	-	-	-	-
K161B	6-II	-	-	-	-	-	-	871	873	-	875	-	-	-	-	-
K162B	6-II	-	-	-	-	-	-	-	-	-	877	-	-	-	-	-
K601	6-II	-	-	-	-	-	-	-	-	-	860	-	-	-	-	-
K701	6-II	-	-	-	-	-	-	-	-	-	895	-	-	-	-	-
K801	6-II	-	-	-	-	-	-	-	-	-	907	-	-	-	-	-
KM	6-II	-	-	-	-	-	-	-	-	-	883	-	-	-	-	-
Kennametal K-151A coating on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1491	-	-	-
Kennametal K-162B coating on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1493	-	-	-
Kennertium W-2	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
Kennertium W-10	6-II	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
Kimble N-51A glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1707	1709	1713	-
Kyanite	4-II	-	-	-	-	-	-	1189	1191	-	1195	-		-	-	-
L																
Lamacoid 6045	6-II	-	-	-	-	-	-	-	-	1230	-	-	-	-	-	-
Lamicoid C-6030	5-II	1130	-	-	-	-	-	1144	-	-	-	-	-	-	-	-
Laminac 4129	6-II	-	-	-	-	-	-	-	-	-	968	-	-	-	-	-
Laminates																
Ceramic	6-II	-	-	-	-	-	-	-	-	-	1225	-	-	-	-	-
Forsterite-stainless steel . .	6-II	-	-	-	-	-	-	-	1223	-	-	-	-	-	-	-
Graphite cloth	6-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
Reinforced epoxide	6-II	-	-	-	-	-	-	1117	[illegible]	1220	1122-1124	-	-	-	-	-

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Laminates (cont.)																
Reinforced epoxy resin . . .	6-II	-	-	-	-	-	-	1115-1117	1120	1220	1122-1124	-	-	-	-	-
Reinforced epoxy and plyophen copolymer resin	6-II	-	-	-	-	-	-	-	-	1218	-	-	-	-	-	-
Reinforced copolymer of phenolic and epoxide resins .	6-II	-	-	-	-	-	-	-	-	-	1126	-	-	-	-	-
Reinforced melamine-formaldehyde resin.	6-II	-	-	-	-	-	-	-	-	1128	-	-	-	-	-	-
Reinforced phenolic resin . .	6-II	1130	-	-	-	-	-	1132-1146	1148-1156	1159-1170, 1220	1172-1179	-	-	-	-	-
Reinforced phenyl silane resin	6-II	-	-	-	-	-	-	1212	-	1220	-	-	-	-	-	-
Reinforced polyester resin. .	6-II	1180	-	-	-	-	-	1191	1195-1198	1220	1200	-	-	-	-	-
Reinforced TAC polyester resin	6-II	1150	-	-	-	-	-	1153	1155	1220	1157-1159	-	-	-	-	-
Reinforced polytetrafluoroethylene	6-II	-	-	-	-	-	-	1214	1216	1220	-	-	-	-	-	-
Reinforced silicone resin . .	6-II	1204	-	-	-	-	-	1206	1208, 1218	1220	1200	-	-	-	-	-
Reinforced teflon	6-II	-	-	-	-	-	-	1214	1218	1220	-	-	-	-	-	-
Lampblacks																
Lampblack	1	-	-	-	-	-	-	-	97	-	-	-	99-101	103	-	-
CEP National	1	-	-	-	-	-	-	-	-	-	-	-	-	102	-	-
L 113SP	1	-	-	-	-	-	-	-	-	-	-	-	101	103	-	-
RW Spektral II	1	-	-	-	-	-	-	-	-	-	-	-	-	103	-	-
Lanthana	4-I	226	226	-	-	-	-	228	-	-	230	-	-	-	-	232
Lanthanum (La)	1	606	606	605	605	605	605	610	-	-	612	-	-	-	-	614
Lanthanum + Calcium	2-I	-	250	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum + Magnesium	2-I	252	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum + Magnesium + ΣX_i . .	2-II	1022	1022	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum aluminides																
LaAl	6-I	43	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAl_2$	6-I	43	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAl_4$	6-I	43	43	-	-	-	-	-	-	-	-	-	-	-	-	-
La_3Al_2	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum antimonide																
La_2Sb	6-I	-	81	-	-	-	-	-	-	-	-	-	-	-	-	-
La_3Sb_2	6-I	-	81	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum arsenide (LaAs) . .	6-I	94	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-bismuth intermetallics (LaBi)	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Lanthanum borides																
LaB_4	6-I	295	296	-	-	-	-	-	-	-	-	-	-	-	-	-
LaB_6	6-I	295	296	-	-	-	309	-	-	-	362	-	-	-	-	-
Lanthanum bromide ($LaBr_3$)	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-cadmium intermetallics																
LaCd	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCd_2$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCd_{11}$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum carbides																
LaC_2	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum chloride ($LaCl_3$)	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-copper intermetallics																
LaCu	6-I	667-668	665	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCu_2$	6-I	667-665	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCu_4$	6-I	-	665	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCu_5$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaCu_6$	6-I	-	665	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum fluoride (LaF_3)	5	-	407	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-gallium intermetallics ($LaGa_2$)	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum germanides ($LaGe_2$)	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-gold intermetallics																
LaAu	6-I	667-668	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAu_2$	6-I	-	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAu_3$	6-I	667	665	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2Au	6-I	667	568	-	-	-	-	-	-	-	-	-	-	-	-	-
La_3Au	6-I	668	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum hydride (LaH_3)	5	427	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-indium intermetallics ($LaIn_3$)	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-lead intermetallics																
LaPb	6-I	-	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaPb_2$	6-I	667	668	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2Pb	6-I	-	668	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-magnesium intermetallics																
LaMg	6-I	667	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaMg_2$	6-I	-	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaMg_3$	6-I	-	558	-	-	-	-	-	-	-	-	-	-	-	-	-
La_3Mg	6-I	-	668	-	-	-	-	-	-	-	-	-	-	-	-	-

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Lanthanum-mercury intermetallics																
LaHg	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaHg_2$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaHg_3$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-nickel intermetallics ($LaNi_5$)	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum nitride (LaN)	5	621	-	-	-	-		-	-	-	-	-	-	-	-	-
Lanthanum-osmium intermetallics ($LaOs_2$)	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum oxides																
LaO	4-I	226	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2O_3	4-I	226	226	-	-	-	-	228	-	-	230	-	-	-	-	232
Lanthanum phosphide (LaP) . . .	5	655	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum selenides																
LaSe	6-I	365	-	-	-	-		-	-	-	-	-	-	-	-	-
La_2Se_3	6-I	365	-	-	-	-	367	-	-	-	-	-	-	-	-	-
La_3Se_4	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum silicides ($LaSi_2$) . . .	6-I	415	415	-	-	-	527	-	-	-	417	-	-	-	-	-
Lanthanum silver intermetallics																
LaAg	6-I	667-668	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAg_2$	6-I	667-668	668	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaAg_3$	6-I	667-668	668	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum stannides																
$LaSn_3$	6-I	541	541	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2Sn	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2Sn_3	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum sulfides																
LaS	5	684	684	-	-	-	-	-	-	-	686	-	-	-	-	-
LaS_2	5	684	-	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2S_3	5	684	684	-	-	-	-	-	-	-	686	-	-	-	-	-
La_3S_4	5	684	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum telluride (La_2Te_3) .	6-I	-	-	-	-	-	638	-	-	-	-	-	-	-	-	-
Lanthanum-thallium intermetallics																
LaTl	6-I	-	669	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaTl_3$	6-I	667	669	-	-	-	-	-	-	-	-	-	-	-	-	-
La_2Tl	6-I	-	669	-	-	-	-	-	-	-	-	-	-	-	-	-
Lanthanum-zinc intermetallics																
LaZn	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$LaZn_5$	6-I	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Lanthanum-zinc intermetallics (cont.)																
$LaZn_{11}$	6-I	667	-	..	-	-	-	-	-	-	-	-	-	-	-	-
Lawsonite	4-II	-	-	-	-	-	-	1233	-	-	-	-	-	-	-	-
Lead + Copper	2-I	254	-	-	-	-	-	-	-	-	256	-	-	-	-	-
Lead aluminate ($PbO \cdot Al_2O_3$) . .	4-II	-	-	-	-	-	-	-	-	-	1003	-	.	-	-	-
Lead borate glass	4-II	-	-	-	-	-	-	-	-	-	1615	-	-	-	-	-
Lead borosilicate glass	4-II	-	-	-	-	-	-	-	-	-	1717	-	-	-	-	-
Lead-barium magnesium aluminum silicate	4-II	-	-	-	-	-	-	-	-	-	1256-1258	-	-	-	-	-
Lead boron silicate ($5\ PbO \cdot B_2O_3 \cdot SiO_2$)	4-II	-	-	-	-	-	-	-	-	-	1250	-	-	-	-	-
Lead germanium oxide ($2\ PbO \cdot GeO_2$)	4-II	-	-	-	-	-	-	-	-	-	1133	-	-	-	-	-
Lead germanium phosphate ($5\ PbO \cdot GeO_2 \cdot P_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1175	.	-	-	-	-
Lead magnesium aluminum silicate	4-II	-	-	-	-	-	-	-	-	-	1252-1254	-	-	-	-	-
Lead molybdate ($PbO_2 \cdot MoO_2$). .	4-II	-	-	-	-	-	-	1113	-	-	1115	-	-	-	-	-
Lead (mon-)oxide (PbO). . . .	4-I	-	-	-	-	-	-	234	-	-	-	-	-	-	-	-
Lead phosphates																
$PbO \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
$2\ PbO \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
$3\ PbO \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
$3\ PbO \cdot 2\ P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
$5\ PbO \cdot 2\ P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
$8\ PbO \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1171	-	-	-	-	-
Lead potassium silicate glass. .	4-II	-	-	-	-	-	-	-	-	1749	-	-	-	-	-	-
Lead silicates																
$PbO \cdot SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1247	-	-	-	-	-
$2\ PbO \cdot SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1247	-	-	-	-	-
$4\ PbO \cdot SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1247	-	-	-	-	-
Lead silicate glass	4-II	-	-	-	-	-	1739	-	1741	-	-	-	1743	1745	1747	-
Lead silicon phosphate ($5\ PbO \cdot SiO_2 \cdot P_2O_5$)	4-II	-	-	-	-	.	-	-	-	-	1177	-	-	-	-	-
Lead strontium silicate glass. .	4-II	-	-	-	-	-	-	-	-	-	1751	-	-	-	-	-
Lead sulfide (PbS)	5	-	-	-	-	-	-	-	-	-	-	-	-	688	-	-
Lead telluride (PbTe)	6-I	-	-	-	-	-	594	-	596	-	-	-	-	-	-	-
Lead telluride + Tin telluride. .	6-I	-	-	-	-	-	717	-	-	-	-	-	-	-	-	-
Lead (meta-)titanate ($PbO \cdot TiO_2$)	4-II	-	-	-	-	-	-	-	1433	-	1435	-	-	-	-	-
Lead tungstate ($PbO \cdot WO_3$) . . .	4-II	-	-	-	-	-	-	1474	-	-	1476	-	-	-	-	-
Lead zirconate ($PbO \cdot ZrO_2$) .	4-II	-	-	-	-	-	-	-	1510	-	-	-	-	-	-	-
Leonhardite	4-II	-	-	-	-	-	-	1233	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Libbey-Owens-Ford plate glass no. 9330	4-II	-	-	-	-	-	-	1791	-	-	-	-	-	-	-	-
Lime	4-I	99	99	-	-	-	101	103	105	-	107	-	-	-	-	109
Lime window glass	4-II	-	-	-	-	-	-	-	1831	-	-	-	-	-	-	-
Lithium + Sodium	2-I	-	-	-	-	-	-	-	-	258	-	-	-	-	-	-
Lithium aluminates																
$Li_2O \cdot Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	1005	-	-	-	-	-
$Li_2O \cdot 5\ Al_2O_3$	4-II	-	-	-	-	-	-	-	-	-	1005	-	-	-	-	-
Lithium aluminum borate glass	4-II	-	-	-	-	-	-	-	-	-	1617	-	-	-	-	-
Lithium aluminum fluoride (Li_3AlF_6)	5	-	-	-	-	-	-	377	-	-	-	-	-	-	-	-
Lithium aluminum silicate																
$Li_2O \cdot Al_2O_3 \cdot 3\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1275	-	-	-	-	-
$Li_2O \cdot Al_2O_3 \cdot 2\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1268-1270	-	-	-	-	-
$Li_2O \cdot 1.08\ Al_2O_3 \cdot 3.5\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1268	-	-	-	-	-
$Li_2O \cdot Al_2O_3 \cdot 4\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1268-1270	-	-	-	-	-
$Li_2O \cdot Al_2O_3 \cdot 6\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1268-1270	-	-	-	-	-
$Li_2O \cdot Al_2O_3 \cdot 8\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1268, 1275	-	-	-	-	-
$Li_2O \cdot Al_2O_3 \cdot 10\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1275	-	-	-	-	-
Lithium aluminum silicate + + Lead bisilicate	4-II	-	-	-	-	-	-	-	-	-	1566	-	-	-	-	-
Lithium aluminum silicate + + Lead borate	4-II	-	-	-	-	-	-	-	-	-	1560	-	-	-	-	-
Lithium aluminum silicate + + Lithium aluminum germanium oxide	4-II	-	-	-	-	-	-	-	-	-	1568	-	-	-	-	-
Lithium aluminum silicate bodies, barium modified	4-II	-	-	-	-	-	-	-	-	-	1277-1281	-	-	-	-	-
Lithium aluminum silicate glass	4-II	-	-	-	-	-	-	-	-	-	1757-1759	-	-	-	-	-
Lithium beryllium borate glass	4-II	-	-	-	-	-	-	-	-	-	1619	-	-	-	-	-
Lithium beryllium fluoride (Li_2BeF_4)	5	-	-	-	-	-	-	379	-	-	-	-	-	-	-	-
Lithium (meta-)borate ($Li_2O \cdot B_2O_3$)	4-II	-	-	-	-	1041	-	-	-	-	-	-	-	-	-	1043
Lithium borate glass	4-II	-	-	-	-	-	1607	-	-	-	-	-	-	-	-	-
Lithium borosilicate glass	4-II	-	-	-	-	-	-	-	-	-	1719	-	-	-	-	-
Lithium calcium silicate glass	4-II	-	-	-	-	-	-	-	-	-	1761	-	-	-	-	-
Lithium carbide (Li_2C_2)	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium chloride (LiCl and Li_2Cl_2)	5	317	317	-	317	317	-	-	-	-	-	-	-	-	-	319
Lithium cobalt oxide ($Li_xCo_{1-x}O$)	4-II	-	-	-	-	-	1135	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Lithium cobalt nickel oxide [$Li_x(Co_yNi_{1-y})_{1-x}O$]	4-II	-	-	-	-	-	1137	-	1139	-	-	-	-	-	-	-
Lithium copper oxide ($Li_xCu_{1-x}O$)	4-II	-	-	-	-	-	1141	-	1143	-	-	-	-	-	-	-
Lithium fluoride (LiF and Li_2F_2)	5	369	369	369	369	369	-	-	371	-	-	-	-	373	-	375
Lithium fluoride + Potassium fluoride	5	-	-	-	-	-	-	409	-	-	-	-	-	-	-	-
Lithium germanium oxides																
$Li_2O \cdot GeO_2$	4-II	-	-	-	-	-	-	-	-	-	1145	-	-	-	-	-
$Li_2O \cdot 7\ GeO_2$	4-II	-	-	-	-	-	-	-	-	-	1145	-	-	-	-	-
$2\ Li_2O \cdot GeO_2$	4-II	-	-	-	-	-	-	-	-	-	1145	-	-	-	-	-
$3\ Li_2O \cdot 2\ GeO_2$	4-II	-	-	-	-	-	-	-	-	-	1145	-	-	-	-	-
$3\ Li_2O \cdot 8\ GeO_2$	4-II	-	-	-	-	-	-	-	-	-	1145	-	-	-	-	-
Lithium hydride (LiH)	5	431	431	431	431	-	-	433	435	-	437	-	-	-	-	-
Lithium lead silicate glass . . .	4-II	-	-	-	-	-	1763		-	-	-	-	-	-	-	-
Lithium-magnesium-barium silicate glass	4-II	-	-	-	-	-	1765		-	-	-	-	-	-	-	-
Lithium magnesium borate glass	4-II	-	-	-	-	-	-	-	-		1621	-	-	-	-	-
Lithium manganese oxide ($Li_xMn_{1-x}O$)	4-II	-	-	-	-	-	1147	-	-	-	-	-	-	-	-	-
Lithium manganese selenide ($Li_xMn_{1-x}Se$)	6-I	-	-	-	-	-	337	-	339	-	-	-	-	-	-	-
Lithium nickel oxide ($Li_xNi_{1-x}O$)	6-II	-	-	-	-	-	1149	-	1151	-	-	-	-	-	-	-
Lithium nitride (Li_3N)	5	621	-	621	621	-	-	-	-	-	-	-	-	-	-	-
Lithium oxide (Li_2O).	4-I	236	236	236	236	236	-	238	-	-	-	-	-	-	-	240
Lithium potassium aluminum silicate	4-II	-	-	-	-	-	-	-	-	-	1283	-	-	-	-	-
Lithium silicates																
$Li_2O \cdot 2\ SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1260	-	-	-	-	-
$2\ Li_2O \cdot SiO_2$	4-II	-	-	-	-	-	-	-	-	-	1260	-	-	-	-	-
Lithium silicate glass	4-II	-	-	-	-	-	1753	-	-	-	1755	-	-	-	-	-
Lithium silicate - quartz body . .	4-II	-	-	-	-	-	-	-	-	-	1262-1264	-	-	-	-	-
Lithium sodium silicate glass .	4-II	-	-	-	-	-	1767	-	-	-	-	-	-	-	-	-
Lithium titanate ($Li_2O \cdot TiO_2$) . .	4-II	-	-	-	-	-	-	1437	-	-	-	-	-	-	-	-
Lithium uranate ($Li_2O \cdot UO_3$) . .	4-II	-	1432	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium zinc ferrite ($Li_xZn_{0.5}Fe_{2.1-x}O_4$)	4-II	-	-	-	-	-	-	1101	-	-	-	-	-	-	-	-
Lockfoam	6-II	962	-	-	-	-	-	-	-	-	966	-	-	-	-	-
Lohm	2-I	-	-	-	-	-	-	-	138	-	-	-	-	-	-	-
LT-1 Metamic cermet	6-II	731	-	-	-	-	-	-	-	-	-	-	735	-	-	-
LT-1B Haynes cermet	6-II	-	-	-	-	-	-	-	-	-	739	-	747	-	-	-
LT-2 Haynes cermet.	6-II	-	-	-	-	-	-			-	743	-	745	-	-	-
Lucalox	4-I	-	-	-	-	-	-	-	11	-	22	-	32	-	-	-
Lucite	6-II	1020	-	-	-	-	-	-	1024	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Lustrex L-2020	6-II	-	1976	-	-	-	-	-	-	-	-	-	-	-	-	-
Lutecium (Lu)	1	616	616	616	616	616	618	620	-	-	-	-	-	-	-	-
Lutecium borides																
LuB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LuB_6	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lutecium carbide (LuC_2)	5	294	-	-	-	-	-	.	-	-	-	-	-	-	-	-
Lutecium-osmium intermetallics ($LuOs_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lutecium oxide (Lu_2O_3).	4-I	-	-	-	-	-	-	242	-	-	244	-	246	-	-	-
M																
Magnesia-alumina spinel. . . .	4-II	-	-	-	-	-	-	-	-	1015	-	-	-	-	-	-
Magnesium (Mg)	1	622	622	622	-	622	624	626	628	630	632	-	634	636-638	-	640
Magnesium + ΣX_i	2-II	-	-	-	-	-	1071-1075	1077	1079	-	1081	-	-	-	-	-
Magnesium + Aluminum + ΣX_i .	2-II	1024	1024	1024	-	-	1026	1029	1031	1033	1035	-	-	1038-1042	-	-
Magnesium + Cerium	2-I	-	-	-	-	-	-	-	260	-	-	-	-	-	-	-
Magnesium + Cerium + ΣX_i. . .	2-II	-	-	-	-	-	-	-	1045	-	-	-	-	-	-	-
Magnesium + Thorium	2-I	264	262	262	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium + Thorium + ΣX_i .	2-II	-	1047	1047	-	-	1049-1053	1055	1057	-	1059	-	-	1061	-	-
Magnesium + Zinc	2-I	-	266	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium + Zinc + ΣX_i . .	2-II	-	1063	1063	-	-	-	1065	1067	-	1069	-	-	-	-	-
Magnesium L120 (British aircraft material spec.). . . .	1	-	-	-	-	-	-	-	-	-	-	-	-	626	-	-
Magnesium alloys (special designation)																
1959	2-I	-	-	-	-	-	-	-	260	-	-	-	-	-	-	-
1960	2-I	-	-	-	-	-	-	-	260	-	-	-	-	-	-	-
1961	2-I	-	-	-	-	-	-	-	260	-	-	-	-	-	-	-
1964	2-II	-	-	-	-	-	-	-	1045	-	-	-	-	-	-	-
1992	2-I	-	-	-	-	-	-	-	1045	-	-	-	-	-	-	-
AM-100A	2-II	-	-	-	-	-	1026	-	-	-	-	-	-	-	-	-
AN-M-29	2-II	1024	-	-	-	-	-	1029	1031	1033	1035	-	-	-	-	-
AN-81-X1	2-II	-	-	-	-	-	-	-	-	-	1035	-	-	-	-	-
AZ-31	2-II	-	-	-	-	-	-	-	-	-	-	-	-	1035	-	-
AZ-31A	2-II	-	1024	1024	-	-	1026	-	-	-	1035	-	-	1040	-	-
AZ-31B	2-II	-	1024	1024	-	-	1026	1029	-	-	1035	-	-	1040-1042	-	-
AZ-63A	2-II	-	-	-	-	-	1026	-	-	-	1035	-	-	-	-	-
AZ-80 . . .	2-II	-	-	-	-	-	-	1029	-	-	-	-	-	-	-	-
AZ-81	2-II	-	-	-	-	-	-	-	-	-	1035	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Magnesium alloys (special designation) (cont.)																
AZ-91C	2-II	-	-	-	-	-	1026	-	-	-	-	-	-	-	-	-
AZ-92A	2-II	-	-	-	-	-	1026	-	-	-	1035	-	-	-	-	-
DTD 350	2-II	-	-	-	-	-	-	-	1079	-	-	-	-	-	-	-
DTD 360	2-II	-	-	-	-	-	-	-	1079	-	-	-	-	-	-	-
EK-30	2-II	-	-	-	-	-	-	-	-	-	1081	-	-	-	-	-
EK-30A	2-II	-	-	-	-	-	1071	-	-	-	-	-	-	-	-	-
EK-32A	2-II	-	-	-	-	-	-	-	-	-	1081	-	-	-	-	-
EK-33A	2-II	-	-	-	-	-	-	-	-	-	1081	-	-	-	-	-
EK-41	2-II	-	-	-	-	-	-	-	-	-	1081	-	-	-	-	-
EK-41A	2-II	-	-	-	-	-	1073	-	-	-	-	-	-	-	-	-
EZ-33A	2-II	-	-	-	-	-	1075	-	-	-	1081	-	-	-	-	-
H-807	2-II	-	-	-	-	-	-	-	1067	-	-	-	-	-	-	-
H-809	2-II	-	-	-	-	-	-	-	1031	-	-	-	-	-	-	-
H-811	2-II	-	-	-	-	-	-	-	1045, 1067	-	-	-	-	-	-	-
H-812	2-II	-	-	-	-	-	-	-	1045	-	-	-	-	-	-	-
H-817	2-II	-	-	-	-	-	-	-	1067	-	-	-	-	-	-	-
HK-31	2-II	-	-	-	-	-	-	-	-	-	1059	-	-	-	-	-
HK-31A	2-II	-	1047	1047	-	-	1049	1055	-	-	-	-	-	1061	-	-
HK-31XA	2-II	-	-	-	-	-	1049	-	-	-	1059	-	-	-	-	-
HM-21XA	2-II	-	1047	1047	-	-	1051	1055	-	-	-	-	-	-	-	-
HM-31XA	2-I	-	262	262	-	-	-	-	-	-	-	-	-	-	-	-
. . . . . .	2-II	-	-	-	-	-	-	1077	-	-	-	-	-	-	-	-
Hydronalium 71	2-II	-	-	-	-	-	1026	-	1031	-	-	-	-	-	-	-
HZ-32A	2-II	-	-	-	-	-	1053	-	-	-	-	-	-	-	-	-
HZ-32XA	2-II	-	-	-	-	-	1053	-	-	-	1059	-	-	-	-	-
Magnox B	2-II	-	-	-	-	-	-	-	1079	-	-	-	-	-	-	-
MSR	2-II	-	-	-	-	-	-	-	1079	-	-	-	-	-	-	-
RZ5	2-II	-	-	-	-	-	-	-	1067	-	-	-	-	-	-	-
TZ6	2-II	-	-	-	-	-	-	-	1067	-	-	-	-	-	-	-
Z3Z	2-II	-	-	-	-	-	-	-	1067	-	-	-	-	-	-	-
ZK-60	2-II	-	1063	1063	-	-	-	-	-	-	-	-	-	-	-	-
ZK-60A	2-II	-	-	-	-	-	-	1065	-	-	1069	-	-	-	-	-
ZREO	2-II	-	-	-	-	-	-	-	1045	-	-	-	-	-	-	-
ZT1	2-II	-	-	-	-	-	-	-	1057	-	-	-	-	-	-	-
ZTY	2-II	-	-	-	-	-	-	-	1057	-	-	-	-	-	-	-
Magnesium aluminate ($MgO \cdot Al_2O_3$)	4-II	1007	1007	-	-	-	1009	1011	1013	1015	1017	-	-	-	-	-
Magnesium aluminate + + Magnesium oxide	4-II	-	-	-	-	-	-	-	1520	-	1522	-	-	-	-	-

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Magnesium aluminate + Silicon (di-)oxide	4-II	-	-	-	-	-	-	-	1532	-	-	-	-	-	-	-
Magnesium aluminate + Sodium (mon-)oxide	4-II	-	-	-	-	-	-	1524	1526	1528	1530	-	-	-	-	-
Magnesium aluminate spinal . .	4-II	1007	1007	-	-	-	1009	1011	1013	1015	1017	-	-	-	-	-
Magnesium aluminate spinel with sodium (mon-)oxide . . .	4-II	-	-	-	-	-	-	1524	1526	1528	1530	-	-	-	-	-
Magnesium aluminum borate glass	4-II	-	-	-	-	-	-	-	-	-	1623	-	-	-	-	-
Magnesium aluminum silicate (2 $MgO \cdot 2\ Al_2O_3 \cdot 5\ SiO_2$) . . .	4-II	-	-	-	-	-	1298	1300	1302	-	1304-1308	-	-	-	-	-
Magnesium aluminum silicate bodies	4-II	-	-	-	-	-	-	-	-	-	1310	-	-	-	-	-
Magnesium aluminum silicate glass	4-II	-	-	-	-	-	-	-	-	-	1769	-	-	-	-	-
Magnesium antimonide (Mg_3Sb_2).	6-I	-	-	-	-	-	67	-	-	-	-	-	-	-	-	-
Magnesium barium cerium titanate [$(Ba_{1-x-y}Mg_xCe_y)O \cdot TiO_2$]	4-II	-	-	-	-	-	1447	-	-	-	-	-	-	-	-	-
Magnesium barium titanate . . .	4-II	-	-	-	-	-	-	-	-	-	1445	-	-	-	-	-
Magnesium beryllium borate glass	4-II	-	-	-	-	-	-	-	-	-	1625	-	-	-	-	-
Magnesium borides																
MgB_2	6-I	-	-	-	-	-	-	182	-	-	-	-	-	-	-	184
MgB_4	6-I	-	-	-	-	-	-	182	-	-	-	-	-	-	-	-
Magnesium-cadmium intermetallics																
MgCd	6-I	-	-	-	-	-	-	644	-	-	-	-	-	-	-	-
$MgCd_3$	6-I	-	-	-	-	-	-	644	-	-	-	-	-	-	-	-
Mg_3Cd	6-I	-	-	-	-	-	-	644	-	-	-	-	-	-	-	-
Magnesium carbonate ($MgCO_3$) .	4-II	-	-	-	-	-	-	-	-	-	-	-	-	1047	-	-
Magnesium chloride ($MgCl_2$) . .	5	-	321	-	-	323	-	-	-	-	-	-	-	-	-	325
Magnesium chromites																
$MgO \cdot Cr_2O_3$	4-II	-	-	-	-	-	1055	1057	-	-	1059	-	-	-	-	-
$MgO \cdot 4\ Cr_2O_3$	4-II	-	-	-	-	-	1055	-	-	-	-	-	-	-	-	-
$4\ MgO \cdot Cr_2O_3$	4-II	-	-	-	-	-	1055	-	-	-	-	-	-	-	-	-
Magnesium chromite spinal . .	4-II	-	-	-	-	-	-	-	-	-	1059	-	-	-	-	-
Magnesium ferrites																
$MgO \cdot Fe_2O_3$	4-II	-	-	-	-	-	1079	1081	-	-	1083	-	-	-	-	-
$MgO \cdot 2\ FeO$	4-II	-	-	-	-	-	-	-	-	-	1083	-	-	-	-	-
Magnesium fluoride (MgF_2). . .	5	-	351	-	-	353	-	-	-	-	355	-	-	-	-	357
Magnesium fluoride coating on quartz	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1425	1427	-
Magnesium germanide (Mg_2Ge) .	6-I	309	309	-	-	-	311	-	-	-	-	-	-	-	-	-
Magnesium hydride (MgH_2). . .	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Magnesium-lead intermetallics (Mg_2Pb)	6-I	-	-	-	-	-	650	-	-	-	-	-	-	-	-	-
Magnesium lead silicate glass .	4-II	-	-	-	-	-	1771	-	-	-	-	-	-	-	-	-
Magnesium molybdate ($MgO \cdot MoO_3$)	4-II	-	-	-	-	-	-	1117	-	-	-	-	-	-	-	-
Magnesium niobates																
$MgO \cdot Nb_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1125	-	-	-	-	-
$2\ MgO \cdot Nb_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1125	-	-	-	-	-
$3\ MgO \cdot Nb_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1125	-	-	-	-	-
$4\ MgO \cdot Nb_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1125	-	-	-	-	-
Magnesium nitride (Mg_3N_2). . .	5	-	-	-	-	-	-	633	-	-	-	-	-	-	-	-
Magnesium oxides																
Magnesium oxide (MgO). . .	4-I	245	248	-	-	-	250	252	254	257	259	263	265-267	269	-	271
M-500	4-I	-	-	-	-	-	-	-	-	-	259	-	-	-	-	-
PC-235	4-I	-	-	-	-	-	-	-	-	257	-	-	-	-	-	-
SR-2803	4-I	-	-	-	-	-	-	-	-	257	-	-	-	-	-	-
Magnesium oxide + Aluminum oxide	4-I	-	-	-	-	-	-	-	-	723	-	-	-	-	-	-
Magnesium oxide + Aluminum oxide + Beryllium oxide. . . .	4-I	-	-	-	-	-	-	-	-	-	725	-	-	-	-	-
Magnesium oxide + Aluminum oxide + Iron(ic) oxide + + Silicon (di-)oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	727	-	-	-	-	-	-	-
Magnesium oxide + Beryllium oxide	4-I	-	-	-	-	-	-	-	729	-	731	-	-	-	-	-
Magnesium oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	-	733	735	-	-	-	-	-
Magnesium oxide + Calcium oxide + Iron(ic) oxide	4-I	-	-	-	-	-	-	-	-	737	-	-	-	-	-	-
Magnesium oxide + Chromium (sesqui-)oxide + Aluminum oxide + Iron(ic) oxide + + Silicon (di-)oxide	4-I	-	-	-	-	-	-	-	739	-	-	-	-	-	-	-
Magnesium oxide + Chromium (sesqui-)oxide + Iron(ic) oxide + Aluminum oxide + + Silicon (di-)oxide + + Iron(ous) oxide	4-I	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-
Magnesium oxide + Iron(ic) oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	743	-	-	-	-	-	-	-
Magnesium oxide + Magnesium aluminate	4-II	-	-	-	-	-	-	-	1536	-	-	-	-	-	-	-
Magnesium oxide + Magnesium silicate	4-II	-	-	-	-	-	-	-	1535	-	-	-	-	-	-	-
Magnesium oxide + Nickel (mon-)oxide	4-I	-	-	-	-	-	745	-	747	-	-	-	-	-	-	-
Magnesium oxide + Silicon (di-)oxide	4-I	-	-	-	-	-	-	-	749	-	751	-	-	-	-	-

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Magnesium oxide + Talc	4-II	-	-	-	-	-	-	-	1533	-	-	-	-	-	-	-
Magnesium oxide + Tin(ic) oxide	4-I	-	-	-	-	-	-	-	753	-	-	-	-	-	-	-
Magnesium oxide + Titanium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	755	-	-	-	-	-
Magnesium oxide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	765	-	-	-	-	-
Magnesium oxide + Uranium (di-)oxide	4-I	-	-	-	-	-	-	-	757	-	-	-	-	-	-	-
Magnesium oxide + Yttrium oxide	4-I	-	-	-	-	-	-	-	-	-	759	-	-	-	-	-
Magnesium oxide + Zinc oxide .	4-I	-	-	-	-	-	-	-	761	-	-	-	-	-	-	-
Magnesium silicates																
$MgO \cdot SiO_2$	4-II	1285	[illegible]	-	-	-	1257	1259	1293	-	1295	-	-	-	-	-
$2\ MgO \cdot SiO_2$	4-II	-	-	-	-	-	-	1259	1291	-	1295	-	-	-	-	-
$3\ MgO \cdot 4\ SiO_2 \cdot H_2O$	4-II	-	-	-	-	-	-	1259	-	-	-	-	-	-	-	-
Magnesium (ortho-)silicate + + Zinc (ortho-)silicate	4-II	-	-	-	-	-	-	-	-	-	1571	-	-	-	-	-
Magnesium silicides (Mg_2Si) . .	6-I	-	419	-	-	-	421	-	-	-	-	-	-	-	-	-
Magnesium silicide stannide ($Mg_2Si_xSn_{1-x}$)	6-I	-	-	-	-	-	537	-	539	-	-	-	-	-	-	-
Magnesium stannate ($MgO \cdot SnO_2$)	4-II	-	-	-	-	-	-	-	1361	-	-	-	-	-	-	-
Magnesium stannide (Mg_2Sn) . .	6-I	533	533	-	-	-	535	-	-	-	-	-	-	-	-	-
Magnesium titanates																
$MgO \cdot TiO_2$	4-II	-	-	-	-	-	1439	1441	-	-	1443	-	-	-	-	-
$MgO \cdot 2\ TiO_2$	4-II	-	-	-	-	-	1439	1441	-	-	1443	-	-	-	-	-
$MgO \cdot 5\ TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1443	-	-	-	-	-
$2\ MgO\ TiO_2$	4-II	-	-	-	-	-	1439	1441	-	-	1443	-	-	-	-	-
$2\ MgO \cdot 3\ TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1445	-	-	-	-	-
Magnesium titanate porcelain. .	5	1003	-	-	-	-	-	-	1017	-	-	-	-	-	-	-
Magnesium tungstate ($MgO \cdot WO_3$)	4-II	-	-	-	-	-	-	1478	-	-	-	-	-	-	-	-
Magnesium tungsten lead oxide ($2\ PbO \cdot MgO \cdot WO_3$).	4-II	-	-	-	-	-	-	-	-	-	[illegible]	-	-	-	-	-
Magnesium vanadates																
$MgO \cdot V_2O_5$	4-II	-	-	-	-	-	-	1492	-	-	-	-	-	-	-	-
$2\ MgO \cdot V_2O_5$	4-II	-	-	-	-	-	-	1492	-	-	-	-	-	-	-	-
Magnesium uranate ($MgO \cdot UO_3$) .	4-II	-	1452	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium zirconate ($MgO \cdot ZrO_2$)	4-II	-	-	-	-	-	-	-	-	-	1512	-	-	-	-	-
Magnetite	4-I	212	212	-	-	-	-	220	-	-	-	-	-	-	-	-
Manganese (Mn)	1	642	542	-	-	642	644	646	-	-	648	-	-	650	-	652
Manganese, electrolytic	1	-	-	-	-	-	-	646	-	-	648	-	-	-	-	-
Manganese + Aluminum . . .	2-I	-	-	-	-	-	-	269	-	-	-	-	-	-	-	-
Manganese + Copper	2-I	-	-	-	-	-	271	273	-	-	275-277	-	-	-	-	-

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Manganese + Copper + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	1053-1059	-	-	-	-	-
Manganese + Nickel	2-I	-	-	-	-	-	279	-	-	-	251	-	-	-	-	-
Manganese + Nickel + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	1091-1097	-	-	-	-	-
Manganese + Titanium	2-I	253, 519	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese alloys (special designations)																
A-47	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-48	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-49	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-49.5	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-50	2-I		-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-51	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-52	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-53	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-54	2-I	-	-	-	-	-	-	263	-	-	-	-	-	-	-	-
A-55	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-56	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-57	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-58	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-59	2-I	-	-	-	-	-	-	265	-	-	-	-	-	-	-	-
A-60	2-I	-		-	-	-	-	265	-	-	-	-	-	-	-	-
Manganese aluminate ($MnO \cdot Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1019	-	-	-	-	-
Manganese aluminum carbide (Mn_3AlC)	5	-	-	-	-	-	-	73	-	-	-	-	-	-	-	-
Manganese antimonide ($MnSb$) .	6-I	-	-	-	-	-	69	-	-	-	-	-	-	-	-	-
Manganese arsenide (Mn_2As) . .	6-I	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese arsenide telluride ($MnTe_{1-x}As_x$)	6-I	-	-	-	-	-	609	-	602	-	-	-	-	-	-	-
Manganese carbide (Mn_3C) . . .	5	67	67	-	-	-	-	69	-	-	-	-	-	-	-	71
Manganese chromate ($MnO \cdot Cr_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1061	-	-	-	-	-
Manganese ferrite ($MnO \cdot Fe_2O_3$).	3-II	1045	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese nickel	2-II	-	-	-	-	-	-	-	-	-	1273	-	-	-	-	-
Manganese nitride (Mn_4N) . . .	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese oxides																
MnO	4-I	-	-	-	-	-	-	273	-	-	261	-	-	-	-	-
MnO_2	4-I	-	-	-	-	-	-	275	-	-	281	-	-	-	-	-
Mn_2O_3	4-I	-	-	-	-	-	-	277	-	-	-	-	-	-	-	-
Mn_3O_4	4-I	-	-	-	-	-	-	-	279	-	-	-	-	-	-	-
Manganese (sesqui-)oxide + + Magnesium oxide	4-I	-	-	-	-	-	-	-	753	-	-	-	-	-	-	-

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Manganese-palladium inter-metallics (MnPd)	6-I	-	654	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese phosphides																
MnP	5	635	635	-	-	-	539	-	-	-	-	-	-	-	-	-
Mn_2P	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Mn_3P	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Mn_3P_2	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese selenide (MnSe)	6-I	-	-	-	-	-	-	341	-	-	-	-	-	-	-	-
Manganese silicate ($MnO \cdot SiO_2$)	4-II	-	-	-	-	-	-	1312	-	-	1314	-	-	-	-	-
Manganese silicides																
$MnSi_{1.7-1.8}$	6-I	-	-	-	-	-	-	427	-	-	-	-	-	-	-	-
MnSi	6-I	-	423	-	-	-	425	427	-	-	431	-	-	-	-	-
$MnSi_2$	5-I	-	-	-	-	-	425	427	429	-	-	-	-	-	-	-
Mn_3Si	6-I	-	423	-	-	-	-	-	-	-	-	-	-	-	-	-
Mn_5Si_3	5-I	-	423	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese telluride (MnTe)	6-I	-	-	-	-	-	-	595	-	-	-	-	-	-	-	-
Manganese zinc carbide (Mn_3ZnC)	5	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-
Manganin	2-II	-	-	-	-	-	973	-	-	-	-	-	-	-	-	-
Marlex 20	6-II	-	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
Marlex 50	6-II	-	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
Massicot	4-I	-	-	-	-	-	-	234	-	-	-	-	-	-	-	-
Matte silver	1	-	-	-	-	-	-	-	-	-	-	919	-	-	-	-
Melamine formaldehyde	6-II	-	1014	-	-	-	-	-	-	-	-	-	-	-	-	-
Melamine formaldehyde, reinforced	6-II	-	-	-	-	-	-	-	-	-	1101	-	-	-	-	-
Melamine formaldehyde, alpha cellulose filled	6-II	-	-	-	-	-	-	-	-	-	1015	-	-	-	-	-
Melamine formaldehyde, mineral filled	6-II	-	-	-	-	-	1016	-	-	-	-	-	-	-	-	-
Melamine-formaldehyde resin, reinforced	5-II	-	-	-	-	-	-	-	-	1155	-	-	-	-	-	-
Melmac 592	6-II	-	-	-	-	-	1015	-	-	-	-	-	-	-	-	-
Melmac 1077	5-II	-	-	-	-	-	-	-	-	-	1015	-	-	-	-	-
Melmac 1079	6-II	-	-	-	-	-	-	-	-	-	1015	-	-	-	-	-
Melmac 1502	6-II	-	-	-	-	-	-	-	-	-	1015	-	-	-	-	-
Merwinite	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
Mercuric selenide (HgSe)	6-I	-	-	-	-	-	-	343	-	-	-	-	-	-	-	-
Metal cermets	6-II	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Metco XP-1103	6-II	-	-	-	-	-	-	-	-	-	-	1309	1311	-	-	-
Metco XP-1105	6-II	-	-	-	-	-	-	-	-	-	-	1325	[illegible]	-	-	-
Metco XP-1109	6-II	-	-	-	-	-	-	-	-	-	-	1407	1409	-	-	-
Metco XP-1110	6-II	-	-	-	-	-	-	-	-	-	-	1421	1423	-	-	-

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Mica																
Mica	5	953	-	-	-	-	945-957	-	959-961	-	950-1001	-	-	-	-	-
Biotite	5	-	-	-	-	-	-	-	-	-	957	-	-	-	-	-
Ceriste	5	-	-	-	-	-	-	-	-	-	953	-	-	-	-	-
Glass bonded	5	-	-	-	-	-	957	-	-	-	-	-	-	-	-	-
Illite	5	-	-	-	-	-	-	-	-	-	950	-	-	-	-	-
Iron	5	-	-	-	-	-	-	-	-	-	957	-	-	-	-	-
Magnesium	5	-	-	-	-	-	-	-	-	-	959	-	-	-	-	-
Muscovite	5	-	-	-	-	-	965	-	-	-	1001	-	-	-	-	-
Phlogophite	5	-	-	-	-	-	-	-	-	-	999	-	-	-	-	-
Ripidolite	5	-	-	-	-	-	-	-	-	-	956	-	-	-	-	-
Synthetic	5	-	-	-	-	-	965	-	961	-	-	-	-	-	-	-
Synthetic, barium-	5	-	-	-	-	-	965	-	-	-	-	-	-	-	-	-
Zinn waldite	5	-	-	-	-	-	-	-	-	-	995	-	-	-	-	-
Micro-Quartz type II	6-II	-	-	-	-	-	-	1216	-	-	-	-	-	-	-	-
MIL-C-7350 type I and II. . . .	6-II	-	-	-	-	-	-	-	-	1275	-	-	-	-	-	-
MIL-C-?021 type I	6-II	-	-	-	-	-	-	-	-	1275	-	-	-	-	-	-
MIL-C-5057	6-II	-	-	-	-	-	-	954	956	-	956	-	-	-	-	-
Mineral aluminum silicates . .	4-II	-	-	-	-	-	1137	-	-	-	-	-	-	-	-	-
Mo-9-5 molybdenum.	1	-	-	-	-	-	-	656	-	-	-	-	-	-	-	-
Molybdenite	5	630	630	-	-	-	-	-	-	-	-	-	-	632	-	-
Molybdenum (Mo)	1	654	654	-	-	654	656	656	660	663	665	667	669-675	677	-	677
Molybdenum coated with boron .	6-II	-	-	-	-	-	-	-	-	-	-	-	1245	-	-	-
Molybdenum coated with carbon.	6-II	-	-	-	-	-	-	-	-	-	-	1253	1256	-	-	-
Molybdenum coated with silicide	6-II	-	-	-	-	-	-	-	-	-	-	-	1467-1469	1471	-	-
Molybdenum coated with titanium (di-)oxide and aluminum . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1356	-	-	-
Molybdenum coating on iron . .	6-II	-	-	-	-	-	-	-	-	-	-	1309	1311	-	-	-
Molybdenum + ΣX_i	2-II	1109	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Iron	2-I	245	-	-	-	-	-	257	259	-	-	-	-	-	-	-
Molybdenum + Nickel + ΣX_i . .	2-II	1099	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum + Niobium + ΣX_i . .	2-II	1101	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum - Silicon	2-I	-	-	-	-	-	-	-	-	-	-	-	291	-	-	-
Molybdenum - Titanium	2-I	-	-	-	-	-	293	295	297	299	301	-	303-307	309	-	-
Molybdenum - Titanium + ΣX_i .	2-II	1103	-	-	-	-	-	1105	-	-	1107	-	-	-	-	-
Molybdenum - Tungsten	2-I	-	-	-	-	-	-	311	313	315	317	-	319	-	-	-
Molybdenum aluminides																
MoAl	6-I	-	9	-	-	-	-	-	-	-	11	-	-	-	-	-
$MoAl_2$	6-I	-	-	-	-	-	-	-	-	-	11	-	-	-	-	-
Mo_3Al	6-I	-	9	-		-	-	-	-	-	-	-	-	-	-	-

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Molybdenum beryllides																
$MoBe_2$	6-I	-	102	-	-	-	-	-	-	-	-	-	-	-	-	-
$MoBe_{12}$	6-I	102	-	-	-	-	-	104	106	-	-	-	-	-	-	-
Molybdenum borides																
MoB	6-I	-	186	-	-	-	-	188	-	-	-	-	-	-	-	192
MoB_2	6-I	-	186	186	-	-	-	188	-	-	190	-	-	-	-	-
Mo_2B	6-I	-	186	-	-	-	-	188	-	-	-	-	-	-	-	192
Mo_2B_5	6-I	-	186	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo_3B_2	6-I	-	186	-	-	-	-	-	-	-	-	-	-	-	-	-
(Di-) molybdenum boride + + Molybdenum (di-) silicide . .	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
(Di-) molybdenum boride + + (Penta-) niobium (tri-) - silicide	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
(Di-) molybdenum boride + + Tantalum (di-) silicide . . .	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
(Di-) molybdenum boride + + (Penta-) tantalum (tri-) - silicide	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum carbides																
MoC	5	-	-	-	-	-	-	-	-	-	87	-	-	-	-	-
Mo_2C	5	77	77	-	-	-	79	81	83	-	85	-	89	-	-	-
Molybdenum chromium silicides																
(Mo, Cr, Si)	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$(Mo, Cr)Si_2$	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum germanide (Mo_3Ge_2)	6-I	-	313	-	-	-	-	-	-	-	-	-	-	-	-	315
Molybdenum nitride (Mo_2N). . .	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum oxides																
MoO_2	4-I	-	-	-	-	-	-	285	-	-	-	-	-	-	-	-
MoO_3	4-I	283	283	283	-	-	-	287	-	-	-	-	-	289	-	291
Molybdenum phosphide (MoP). .	5	635	635	-	-	-	639	-	-	-	-	-	-	-	-	-
Molybdenum selenides ($MoSe_2$) .	6-I	-	-	-	-	-	367	-	369	-	-	-	-	-	-	-
Molybdenum silicides																
$MoSi_2$	6-I	433	433	-	-	-	435	437	439	-	441	-	445-447	449	-	-
Mo_3Si	6-I	-	-	-	-	-	-	-	-	-	443	-	-	-	-	451
Mo_5Si_3	6-I	433	433	-	-	-	-	-	-	-	443	-	-	-	-	-
Molybdenum (di-) silicide + + Calcium aluminate	5	-	-	-	-	-	-	-	-	-	904	-	-	-	-	-
Molybdenum (di-) silicide + + Chromium (sesqui-) oxide. .	5	-	-	-	-	-	-	-	-	-	-	-	906	-	-	-
Molybdenum (di-) silicide + + Chromium (di-) silicide. . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (di-) silicide + + Copper cermets	6-II	923	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Molybdenum (di-)silicide + + Molybdenum (tri-)oxide. . .	5	-	-	-	-	-	-	-	-	-	-	-	908-910	912	-	-
Molybdenum (di-)silicide + + Molybdenum (tri-)oxide + + Silicon (di-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	914-916	918	-	-
Molybdenum (di-)silicide + + Silicon (di-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	920-922	924	-	-
Molybdenum (di-)silicide + + Zirconium (di-)boride . . .	6-I	-	689, 724	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum-silicon-titanium cermet	6-II	930	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum sulfide (MoS_2). . .	5	690	690	-	-	-	-	-	-	-	-	-	-	692	-	-
Molybdenum tellurides ($MoTe_2$).	6-I	-	-	-	-	-	638	-	640	-	-	-	-	-	-	-
Molybdenum-titanium alloys coated with Chromalloy W-2 .	6-II	-	-	-	-	-	-			-	-	-	1505-1509	-	-	-
Molybdenum-titanium alloy coated with Durak-MG	6-II	-	-	-	-	-	-	-	-	-	-	-	1501-1503	-	-	-
Molybdenum-zirconium inter-metallics (Mo_2Zr)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Monel	2-I	-	-	-	-	-	-	-	-	-	343	-	-	-	-	-
. . . . . .	2-II	-	-	-	-	-	-	1239	1241	-	1247-1251	-	1253	-	-	-
Monel 400	2-II	-	-	-	-	-	-	1239	1241	-	1247-1249	-	1253	-	-	-
Monel 401	2-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Monel 403	2-II	-	-	-	-	-	-	-	-	-	1249	-	-	-	-	-
Monel 404	2-II	-	-	-	-	-	-	-	-	-	1251	-	-	-	-	-
Monel 501	2-II	-	-	-	-	-	-	-	-	-	1245	-	-	-	-	-
Monel, H-	2-II	-	-	-	-	-	-	-	1241	-	-	-	-	-	-	-
Monel, K-	2-II	1237	-	-	-	-	-	1239	1241	1243	1245	-	-	-	-	-
Monel K-500	2-II	1237	-	-	-	-	-	1239	1241	1243	1245	-	-	-	-	-
Monel 5700, K-	2-II	-	-	-	-	-	-	-	-	-	-	-	1255	-	-	-
Monel, KR-	2-II	-	-	-	-	-	-	-	-	-	1245	-	-	-	-	-
Monel, R	2-II	-	-	-	-	-	-	-	1241	-	1247	-	-	-	-	-
Monel, R-405	2-II	-	-	-	-	-	-	-	1241	-	1247	-	-	-	-	-
Monel. S-	2-II	-	-	-	-	-	-	-	1241	-	-	-	-	-	-	-
Monel, Si-	2-II	-	-	-	-	-	-	-	1241	-	-	-	-	-	-	-
Moplen	6-II	1076	1076	-	-	-	-	1078	1080	-	1088	-	-	-	-	-
Mullite	4-II	-	-	-	-	-	-	1189	1191	1193	1197	-	1201	-	1203	-
Mullite MV-20	4-II	-	-	-	-	-	-	-	-	1193	-	-	1201	-	-	-
Mullite MV-30	4-I	-	-	-	-	-	-	-	-		617	-	-	-	-	-

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Mullite + Alumina	4-II	-	-	-	-	-	-	-	1562	-	-	-	-	-	-	-
Muscovite	4-II	-	-	-	-	-	-	1573	-	-	-	-	-	-	-	-
MX-4926 carbon-phenolic laminate	6-II	-	-	-	-	-	-	1134	-	-	-	-	-	-	-	-
Mylar coated with aluminum . .	6-II	-	-	-	-	-	-	-	-	-	-	-		1287	-	-
Mylar coated with copper. . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1301	-	-
Mylar coated with gold.	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1307	-	-
Mylar coated with silver	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1323	-	-
N																
NBS coating A-418 on Inconel. .	6-II	-	-	-	-	-	-	-	-	-	-	-	1361-1363	-	-	-
NBS coating A-418 on stainless steel	6-II	-	-	-	-	-	-	-	-	-	-	-	1365-1367	-	-	-
NBS coating N-143 on Inconel. .	6-II	-	-	-	-	-	-	-	-	-	-	-	1353-1355	-	-	-
NBS coating N-143 on stainless steel	6-II	-	-	-	-	-	-	-	-	-	-	-	1357-1359	-	-	-
Neodymia	4-I	293	293	-	-	-	-	295	-	-	297	-	-	-	-	-
Neodymium (Nd)	1	681	681	681	681	683	684	686	-	-	688	-	-	-	-	690
Neodymium + Magnesium . . .	2-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium + Magnesium + ΣX_1 .	2-II	1115	1115	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium aluminide (NdAl) . .	6-I	43	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-bismuth intermetallics (NdBi)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium borides																
NdB_4	6-I	296	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NdB_6	6-I	296	296	-	-	-	300	-	-	-	-	-	-	-	-	-
Neodymium-cadmium intermetallics																
NdCd	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$NdCd_2$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$NdCd_3$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$NdCd_{11}$	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium carbides																
NdC_2	5	294	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium chloride ($NdCl_3$) . .	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-cobalt intermetallics ($NdCo_5$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-copper intermetallics ($NdCu_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-gallium intermetallics ($NdGa_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Neodymium germanides ($NdGe_3$)	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium hydride (NdH_2) . . .	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-lead intermetallics ($NdPb_3$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-mercury intermetallics (NdHg)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-nickel intermetallics ($NdNi_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium nitride (NdN) . . .	5	621	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium-osmium intermetallics ($NdOs_2$)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium oxides																
NdO	4-I	293	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd_2O_3	4-I	293	293	-	-	-	-	295	-	-	297	-	-	-	-	-
Neodymium phosphide (NdP) . .	5	635	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium selenides																
NdSe	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd_2Se_3	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd_3Se_4	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium silicide ($NdSi_2$) . .	6-I	523	524	-	-	-	527	-	-	-	-	-	-	-	-	-
Neodymium-silver intermetallics (NdAg)	6-I	680	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium sulfides																
NdS	5	694	694	-	-	-	-	-	-	-	696	-	-	-	-	-
NdS_2	5	-	694	-	-	-	-	-	-	-	-	-	-	-	-	-
Nd_2S_3	5	694	694	-	-	-	-	-	-	-	696	-	-	-	-	-
Nd_3S_4	5	694	694	-	-	-	-	-	-	-	-	-	-	-	-	-
Neoprene GN	6-II	-	-	-	-	-	-	-	-	1066	-	-	-	-	-	-
Neoprene W	6-II	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nepheline syenite	4-II	-	-	-	-	-	-	-	-	-	1320	-	-	-	-	-
Neptunium (Np)	1	692	692	-	-	-	-	-	-	-	-	-	-	-	-	-
Neptunium + Calcium + ΣX_i . .	2-II	1111	-	-	-	-	-	1113	-	-	-	-	-	-	-	-
Neptunium + Uranium	2-I	321	321	-	-	-	-	-	-	-	-	-	-	-	-	-
Neptunium bromide ($NpBr_3$) . .	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neptunium chlorides																
$NpCl_3$	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$NpCl_4$	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neptunium (di-)oxide (NpO_2) . .	4-I	-	-	-	-	-	-	259	-	-	-	-	-	-	-	-
Nichrome	2-I	-	-	-	-	-	-	-	-	-	-	-	331	-	-	-
Nickel (Ni)	1	694	694	-	-	-	696	698	700	702	704	706	708-714	716-718	-	720
Nickel, carbonyl	1	-	694	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel, electrolytic	1	694	694	-	-	-	-	683	-	-	704	-	-	716	-	-

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Nickel coated with aluminum phosphate	6-II	-	-	-	-	-	-	-	-	-	-	-	1420	-	-	-
Nickel + ΣX_i	2-II	1307	-	-	-	-	1309	1311	1313	1315	-	-	-	-	-	-
Nickel + Aluminum	2-I	-	-	-	-	-	325	-	-	-	-	-	-	-	-	-
Nickel + Aluminum + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	1117	-	-	-	-	-
Nickel + Chromium	2-I	-	-	-	-	-	327	329	-	-	-	-	331-333	-	-	-
Nickel + Chromium + ΣX_i . . .	2-II	1119 112[illegible]	1119	-	-	-	1124	1126-1132	1134-1145	1149-1150	1152-1170	-	1172-1201	1203-1215	-	-
Nickel + Cobalt	2-I	335	-	-	-	-	-	-	337	-	-	-	-	-	-	-
Nickel + Cobalt + ΣX_i	2-II	1219	12[illegible]	-	-	-	1221	-	1223	-	1225-1227	-	1229-1231	-	-	-
Nickel + Copper	2-I	-	-	-	-	-	339	341	-	-	343	-	-	-	-	-
Nickel + Copper + ΣX_i	2-II	1237	-	-	-	-	-	1239	1241	1243	1245-1251	-	1253-1255	-	-	-
Nickel + Iron	2-I	-	-	-	-	-	345	347	349	-	-	-	-	-	-	-
Nickel + Iron + ΣX_i	2-II	1257	-	-	-	-	-	1259	1261	-	1263-1267	-	1269	-	-	-
Nickel + Manganese	2-I	-	-	-	-	-	351	-	353	-	355	-	-	-	-	-
Nickel + Manganese + ΣX_i . . .	2-II	-	-	-	-	-	-	1271	-	-	1273	-	-	-	-	-
Nickel + Molybdenum + ΣX_i . .	2-II	1277	1275	-	-	-	-	1279	1281	-	1283-1287	1285	1291-1295	1297	-	-
Nickel + Palladium	2-I	-	-	-	-	-	357	-	-	-	-	-	-	-	-	-
Nickel + Palladium + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	1299	-	-	-	-	-
Nickel + Silicon	2-I	-	-	-	-	-	359	-	-	-	-	-	-	-	-	-
Nickel + Silicon + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	1301	-	-	-	-	-
Nickel + Titanium + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	1303	-	-	-	-	-
Nickel + Tungsten + ΣX_i	2-II	-	-	-	-	-	-	-	-	-	1305	-	-	-	-	-
Nickel 200	2-I	-	-	-	-	-	-	-	-	-	355	-	-	-	-	-
(also) . . .	2-II	1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel 204	2-II	-	-	-	-	-	-	-	-	-	1227	-	-	-	-	-
Nickel 211	2-I	-	-	-	-	-	-	-	-	-	355	-	-	-	-	-
Nickel 270	1	-	-	-	-	-	-	-	-	-	704	-	-	-	-	-
Nickel A	1	-	-	-	-	-	-	-	700	-	-	-	-	-	-	-
(also) . . .	2-I	-	-	-	-	-	-	-	-	-	355	-	-	-	-	-
(also) . . .	2-II	1307	-	-	-	-	-	-	1313	-	-	-	-	-	-	-
Nickel, admiralty	2-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Nickel D	2-I	-	-	-	-	-	-	-	-	-	355	-	-	-	-	-
(also) . . .	2-II	-	-	-	-	-	-	-	1313	-	-	-	-	-	-	-
Nickel, grade A	1	694	-	-	-	-	-	-	700	-	704	706	710-712	718	-	-
(also) . . .	2-I	-	-	-	-	-	-	-	353	-	-	-	-	-	-	-
(also) . . .	2-II	-	-	-	-	-	-	-	1223	-	1263, 1301	-	-	-	-	-
Nickel L	1	-	-	-	-	-	-	-	700	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Nickel alloys (special designations)																
60 – 15 Cr (ASTM B83-46)	2-II	1257	–	–	–	–	–	1259	–	–	–		–	–	–	–
80 Ni – 20 Cr	2-II	–	–	–	–	–	–	1130	1144	–	–	–	–	–	–	–
90 Ni – 10 Cr	2-II	–	–	–	–	–	–	1126	–	–	–	–	–	–	–	–
AISI alloy (see AISI designations)																
Alumel	2-II	–	–	–	–	–	–	1271	–	–	–	–	–	–	–	–
Astroloy	2-II	–	–	–	–	–	–	–	–	–	–	–	1229	1231	–	–
Brazing alloys GE-62	2-II	–	–	–	–	–	–	–	–	–	1165	–	–	–	–	–
Brazing compound GEH 62-5	2-II	–	–	–	–	–	–	1130	–	–	–	–	–	–	–	–
Chromel-P	2-I	–	–	–	–	–	–	329	–	–	–	–	–	–	–	–
Contracid	2-II	–	–	–	–	–	–	–	1261	–	–	–	–	–	–	–
D-979	2-II	–	–	–	–	–	–	–	1261	–	–	–	–	–	–	–
Duranickel 301	2-II	–	–	–	–	–	–	–	–	–	1117	–	–	–	–	–
DVL 32	2-II	1219	–	–	–	–	–	–	–	–	1225	–	–	–	–	–
DVL 321a	2-II	1219	–	–	–	–	–	–	–	–	1225	–	–	–	–	–
DVL 321i	2-II	1219	–	–	–	–	–	–	–	–	1225	–	–	–	–	–
DVL 325a	2-II	1219	–	–	–	–	–	–	–	–	1225	–	–	–	–	–
EI-435	2-II	–	–	–	–	–	–	1132	1144	1150	–	–	–	–	–	–
EI-437	2-II	–	–	–	–	–	–	–	1140	–	–	–	–	–	–	–
EI-607	2-II	–	–	–	–	–	–	–	1145	–	1156	–	–	–	–	–
EI-617	2-II	–	–	–	–	–	–	–	–	–	1170	–	–	–	–	–
GMR-235	2-II	–	–	–	–	–	–	–	–	–	1161	–	–	–	–	–
Haskins alloy 667	2-II	–	–	–	–	–	–	–	–	–	1273	–	–	–	–	–
Haynes alloy no. R-41	2-II	–	–	–	–	–	–	–	–	–	1154	–	–	–	–	–
Haynes alloy X	2-II	–	–	–	–	–	–	–	–	–	–	–	1172	–	–	–
Hastelloys (see Hastelloy)																
HU	2-II	–	–	–	–	–	–	–	–	–	1265	–	–	–	–	–
HW	2-II	–	–	–	–	–	–	–	–	–	1267	–	–	–	–	–
Illium alloy	2-II	–	–	–	–	–	–	–	–	–	1156	–	–	–	–	–
Illium G	2-II	–	–	–	–	–	–	–	1136	–	–	–	–	–	–	–
Illium R	2-II	–	–	–	–	–	–	–	1138	–	–	–	–	–	–	–
Inco (see Inco)																
Incoloys (see Incoloy)																
Inconels (see Inconel)																
INOR-8	2-II	–	–	–	–	–	–	–	1281	–	1285	–	1293	–	–	–
J-1500	2-II	–	–	–	–	–	–	–	1136	–	1186	–	–	–	–	–
J-1610	2-II	–	–	–	–	–	–	–	1134	–	1156	–	–	–	–	–
M-252	2-II	–	–	–	–	–	–	1130	1136	–	1106	–	[illegible], 1197	1209, 1215	–	–
Monels (see Monel)																

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Nickel alloys (special designations) (cont.)																
Ni-O-Nel	2-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
Nichrome	2-I	-	-	-	-	-	-	-	-	-	-	-	331	-	-	-
Nicarome V	2-II	-	-	-	-	-	-	1130	1144	-	-	-	-	-	-	-
Nimonics (see Nimonic)																
OKh 20N60B	2-II	-	-	-	-	-	-	1132	1136	1150	-	-	-	-	-	-
OKh 21N78T	2-II	-	-	-	-	-	-	1132	-	1150	-	-	-	-	-	-
Permanickel 300	2-II	1257	-	-	-	-	-	-	-	-	1303	-	-	-	-	-
RCA-N91	2-I	-	-	-	-	-	-	-	337	-	-	-	-	-	-	-
RCA-N97	2-I	-	-	-	-	-	-	-	337	-	-	-	-	-	-	-
Refractaloy 26	2-II	-	-	-	-	-	-	-	1223	-	-	-	-	-	-	-
Rene 41	2-II	1122	-	-	-	-	-	1130	1134	-	1156	-	1154, 1159	1211	-	-
SM-200	2-II	-	-	-	-	-	-	-	-	-	1305	-	-	-	-	-
Udimets (see Udimet)																
Unitemp Waspaloy	2-II	-	-	-	-	-	-	-	1136	-	-	-	-	-	-	-
Waspaloy	2-II	-	-	-	-	-	-	-	1136	-	1154	-	-	-	-	-
Nickel aluminate ($NiO \cdot Al_2O_3$) . .	4-II	-	-	-	-	-	-	-	-	-	1021	-	1023	-	-	-
Nickel aluminides																
NiAl	6-I	-	-	-	-	-	-	-	-	-	13	-	15-17	19	-	-
Ni_3Al	6-I	-	-	-	-	-	-	-	-	-	13	-	15-17	19	-	-
Nickel aluminides coating on Inconel	6-II	-	-	-	-	-	-	-	-	-	-	-	1453-1455	1457	-	-
Nickel aluminide + Aluminum oxide	5	-	-	-	-	-	-	-	-	-	-	-	844-846	848	-	-
Nickel aluminide + Nickel (mon-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	850-852	854	-	-
Nickel aluminide + Nickel (mon-)oxide + Aluminum oxide	5	-	-	-	-	-	-	-	-	-	-	-	856-858	860	-	-
Nickel borides																
Ni_2B	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_3B	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_3B_2	6-I	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel carbide (Ni_3C)	5	-	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel chrome spinel coating on niobium-zirconium alloys . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1397	-	-	-
Nickel chromite coating on niobium-zirconium alloy . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1397	-	-	-

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Nickel-chromium alloy coating on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1333	1335	-	-
Nickel ferride (Ni_3Fe)	6-I	-	-	-	-	-	-	-	-	-	324	-	-	-	-	-
Nickel ferrite ($NiO \cdot Fe_2O_3$) . . .	4-II	-	-	-	-	-	1087	1089	-	-	1091	-	-	-	-	-
Nickel ferrite spinel.	4-II	-	-	-	-	-	-	1080	-	-	-	-	-	-	-	-
Nickel-lead silicate glass . . .	4-II	-	-	-	-	-	1773	-	-	-	-	-	-	-	-	-
Nickel-manganese intermetallics (Ni_3Mn)	6-I	-	-	-	-	-	652	654	-	-	-	-	-	-	-	-
Nickel (mon-)oxide (NiO) . . .	4-I	-	-	-	-	-	-	301	303	-	305	-	307-309	311	-	-
Nickel (mon-)oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	765	-	-	-	-	-	-	-
Nickel (mon-)oxide + Nickel aluminide	5	-	-	-	-	-	-	-	-	-	-	-	777-779	781	-	-
Nickel phosphides																
Ni_3P	5	-	635	-	-	-	-	-	-	-	-	-	-	.	-	-
Ni_2P	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
$Ni_{12}P_5$	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel selenides																
$NiSe_{1, 1-2, 05}$	6-I	345	-	-	-	-	-	347	-	-	-	-	-	-	-	-
Nickel silicides																
NiSi	6-I	-	453	-	-	-	-	-	-	-	-	-	-	-	-	-
$NiSi_2$	6-I	-	453	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_2Si	6-I	-	453	-	-	-	-	-	-	-	455	-	-	-	-	-
Ni_3Si	6-I	-	453	-	-	-	-	-	-	-	455	-	-	-	-	-
Ni_3Si_2	6-I	-	453	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel-tantalum intermetallics (Ni_3Ta)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel tellurides																
NiTe	6-I	-	-	-	-	-	-	604	-	-	-	-	-	-	-	-
$NiTe_{1.1-1.8}$	5-I	-	-	-	-	-	-	604	-	-	-	-	-	-	-	-
$NiTe_2$	6-I	-	-	-	-	-	-	604	-	-	-	-	-	-	-	-
Nickel titanate ($NiO \cdot TiO_2$) . . .	4-II	-	-	-	-	-	1422	-	-	-	-	-	-	-	-	-
Nickel zinc ferrite ($Ni_xZn_{1-x}O \cdot Fe_2O_3$)	4-II	-	-	-	-	-	-	1093	1095	-	-	-	-	-	-	-
Nickel-zirconium intermetallics																
NiZr	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_3Zr	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_4Zr	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Nimonic 75	2-II	-	-	-	-	-	-	-	1144	-	-	-	1182	-	-	-
Nimonic 80	2-II	-	-	-	-	-	-	-	1140	-	-	-	-	-	-	-
Nimonic 80/80A	2-II	-	-	-	-	-	-	-	1140	-	-	-	-	-	-	-
Nimonic 90	2-II	-	-	-	-	-	-	-	1136	-	-	-	-	-	-	-
Nimonic 95	2-II	-	-	-	-	-	-	-	1136	-	-	-	-	-	-	-

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Nimonic 100	2-II	1219	1217	-	-	-	-	-	1223	-	1227	-	-	-	-	-
Nimonic 105	2-II	-	-	-	-	-	-	-	1223	-	-	-	-	-	-	-
Niobium (Nb)	1	722	722	-	-	-	724	726	728	730	732	-	734-738	740	-	742
Niobium coated with aluminide . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1435-1437	1439	-	-
Niobium coated with niobium aluminide	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1450	-	-
Niobium + ΣX_i	2-II	-	-	-	-	-	-	1361	-	-	-	-	-	-	-	-
Niobium + Iron + ΣX_i	2-II	-	-	-	-	-	-	1317	-	-	-	-	-	-	-	-
Niobium + Molybdenum + ΣX_i . .	2-II	1319	-	-	-	-	-	1321	1323	1325	1327	-	-	-	-	-
Niobium + Tantalum	2-I	-	361	-	-	-	363	-	365	-	-	-	-	-	-	-
Niobium + Tantalum + ΣX_i . . .	2-II	-	-	-	-	-	-	1329	1331	1333	1335	-	-	-	-	-
Niobium + Titanium	2-I	-	-	-	-	-	367	-	-	-	-	-	-	-	-	-
Niobium + Titanium + ΣX_i . . .	2-II	1337	-	-	-	-	-	1339	1341	1343	1345	-	1347	-	-	-
Niobium + Tungsten	2-I	-	-	-	-	-	-	-	-	-	-	-	369-371	-	-	-
Niobium + Tungsten + ΣX_i . . .	2-II	-	-	-	-	-	-	1349	1351	1353	1355	-	-	-	-	-
Niobium + Uranium	2-I	-	-	-	-	-	-	-	373	-	375	-	-	-	-	-
Niobium + Vanadium	2-I	-	-	-	-	-	377	-	-	-	-	-	-	-	-	-
Niobium + Vanadium + ΣX_i . . .	2-II	-	-	-	-	-	-	-	1357	-	1359	-	-	-	-	-
Niobium + Zirconium	2-I	-	-	-	-	-	379	381	383	-	385	-	387-389	-	-	-
Niobium alloys (special desig.)																
5 Mo - 5 V - Zr	2-II	-	-	-	-	-	-	1321	-	1325	-	-	-	-	-	-
27 Ta - 12 W - 0.5 Zr	2-II	-	-	-	-	-	-	1329	-	1333	-	-	-	-	-	-
10 Ti - 5 Zr	2-II	-	-	-	-	-	-	1339	-	1343	-	-	-	-	-	-
10 W - 1 Zr - 0.1 C	2-II	-	-	-	-	-	-	1349	-	1353	-	-	-	-	-	-
10 W - 5 Zr	2-II	-	-	-	-	-	-	1349	-	1353	-	-	-	-	-	-
15 W - 5 Mo - 1 Zr	2-II	-	-	-	-	-	-	1349	-	-	-	-	-	-	-	-
15 W - 5 Mo - 1 Zr - 0.5 C . .	2-II	-	-	-	-	-	-	-	-	1353	-	-	-	-	-	-
B-66	2-II	-	-	-	-	-	-	-	-	-	1327, 1359	-	-	-	-	-
Cb-752	2-II	-	-	-	-	-	-	1349	-	-	1355	-	-	-	-	-
F-48	2-II	-	-	-	-	-	-	1349	-	-	1355	-	-	-	-	-
Ferroniobium	2-II	-	-	-	-	-	-	1317	-	-	-	-	-	-	-	-
FS-82	2-II	-	-	-	-	-	-	-	-	-	1335	-	-	-	-	-
FS-82B	2-II	-	-	-	-	-	-	1329	-	-	1335	-	-	-	-	-
FS-85	2-II	-	-	-	-	-	-	-	-	-	1335	-	-	-	-	-
MAR-M200	2-II	-	-	-	-	-	-	-	-	-	1305	-	-	-	-	-
Niobium aluminide ($NbAl_3$) . . .	6-I	-	21	-	-	-	-	-	-	-	-	-	-	23	-	-
Niobium aluminide coating on niobium	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1452	-	-

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Niobium beryllides																
$NbBe_{12}$	6-I	-	108	-	-	-	-	-	-	-	-	-	-	-	-	-
$NbBe_{17}$	6-I	-	108	-	-	-	-	110	112	-	114	-	115	120	-	-
Nb_2Be_{17}	6-I	-	-	-	-	-	-	-	112	-	-	-	116-118	120	-	-
Niobium borides																
NbB	6-I	-	194	-	-	-	-	-	-	-	-	-	-	-	-	-
NbB_2	6-I	134	194	-	-	-	-	196	-	-	195	-	200-202	-	-	-
Nb_3B_2	6-I	-	194	-	-	-	-	-	-	-	-	-	-	-	-	-
Nb_3B_4	6-I	-	194	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium (di-)boride + Zirconium (di-)boride	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium carbide (NbC)	5	91	91	-	-	-	93	95-97	99	-	101	-	104-106	-	-	-
Niobium-chromium intermetallics ($NbCr_2$)	6-I	-	594	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium-cobalt intermetallics ($NbCo_2$)	6-I	-	644	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium ferride ($NbFe_2$)	6-I	-	306	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium germanides																
$NbGe_2$	6-I	323	323	-	-	-	-	-	327	-	-	-	-	-	-	-
Nb_3Ge	6-I	-	323	-	-	-	-	-	-	-	-	-	-	-	-	-
Nb_5Ge_3	6-I	323	323	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium germanide silicides ($NbGe_xSi_{1-x}$)	6-I	-	-	-	-	-	-	-	529	-	-	-	-	-	-	-
Niobium-manganese intermetallics ($NbMn_2$)	6-I	-	694	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium nitrides																
NbN	5	535	535	-	-	-	537	-	-	-	539	-	-	-	-	-
Nb_2N	5	-	535	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium oxides																
NbO	4-I	-	-	-	-	-	-	315	-	-	-	-	-	-	-	-
NbO_2	4-I	-	-	-	-	-	-	317	-	-	-	-	-	-	-	-
Nb_2O_5	4-I	313	-	313	-	-	-	319	-	-	321	-	-	-	-	-
Niobium (pent-)oxide + + Aluminum oxide	4-I	-	767	-	-	-	-	-	-	-	769	-	-	-	-	-
Niobium (pent-)oxide + + Beryllium oxide	4-I	-	771	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium (pent-)oxide + + Magnesium oxide	4-I	-	773	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium (pent-)oxide + + Titanium (di-)oxide	4-I	-	775	-	-	-	-	-	-	-	777	-	-	-	-	-
Niobium (pent-)oxide + + Zirconium (di-)oxide	4-I	-	779	-	-	-	-	-	-	-	781	-	-	-	-	-
Niobium phosphide (NbP)	5	635	635	-	-	-	639	-	-	-	-	-	-	-	-	-
Niobium selenide ($NbSe_2$)	6-I	-	-	-	-	-	367	-	369	-	-	-	-	-	-	-

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Niobium silicides																
$NbSi_2$	6-I	-	-	-	-	-	527	-	529	-	-	-	-	-	-	-
Nb_4Si	6-I	-	457	-	-	-	-	-	-	-	-	-	-	-	-	-
Nb_5Si_3	6-I	-	457	-	-	-	-	-	-	-	459	-	-	-	-	-
(Penta-) niobium (tri-) silicide + + (Di-) molybdenum boride . .	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium silicide germanides																
NbSiGe	6-I	-	-	-	-	-	317	-	319	-	-	-	-	-	-	-
$NbSi_{1-x}Ge_x$	6-I	-	-	-	-	-	317	-	319	-	-	-	-	-	-	-
Niobium stannide (Nb_3Sn) . . .	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium telluride ($NbTe_2$) . . .	6-I	-	-	-	-	-	606	-	608	-	-	-	-	-	-	-
Niobium-zirconium alloy coated with barium titanate	6-II	-	-	-	-	-	-	-	-	-	-	-	1369	-	-	-
Niobium-zirconium alloy coated with boron	6-II	-	-	-	-	-	-	-	-	-	-	-	1291	-	-	-
Niobium-zirconium alloy coated with calcium titanate	6-II	-	-	-	-	-	-	-	-	-	-	-	1371	-	-	-
Niobium-zirconium alloy coated with iron titanate	6-II	-	-	-	-	-	-	-	-	-	-	-	1385	-	-	-
Niobium-zirconium alloy coated with nickel chromite	6-II	-	-	-	-	-	-	-	-	-	-	-	1387	-	-	-
Niobium-zirconium alloys coated with silicon carbide	6-II	-	-	-	-	-	-	-	-	-	-	-	1415	-	-	-
Nodular cast iron	3	-	-	-	-	-	-	-	3[illegible], 37, 437	-	41, 444	-	-	-	-	-
Nodular cast iron, ferritic base .	3	-	-	-	-	-	-	-	37	-	-	-	-	-	-	-
Nodular cast iron, pearlitic base	3	-	-	-	-	-	-	-	35	-	41	-	-	-	-	-
Nycar PA-21	6-II	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nylon	6-II	-	-	-	-	-	-	1047	-	-	1049	-	-	-	-	-
Nylon 1 N fabrics	6-II	-	-	-	-	-	-	-	-	1273	-	-	-	-	-	-
Nylon 6	6-II	-	-	-	-	-	-	1047	-	-	1049	-	-	-	-	-
Nylon 9	6-II	-	-	-	-	-	-	-	-	-	1049	-	-	-	-	-
Nylon 11	6-II	-	-	-	-	-	-	-	-	-	1049	-	-	-	-	-
Nylon 11 N fabric	6-II	-	-	-	-	-	-	-	-	[illegible]3	-	-	-	-	-	-
Nylon 66	6-II	-	-	-	-	-	-	-	-	-	1049	-	-	-	-	-
Nylon fabric	6-II	-	-	-	-	-	-	-	-	1273	-	-	-	-	-	-
Nylon FM-1	6-II	-	-	-	-	-	-	-	-	-	1049	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
O																
OFHC copper	1	-	-	-	-	-	-	-	458	460	-	-	-	-	-	-
Opalon 300 FM	6-II	-	1076	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic fiber cloth	6-II	-	-	-	-	-	-	-	-	-	1275	-	-	-	-	-
Osmium (Os)	1	744	744	-	-	-	746	-	748	-	-	-	750	-	-	-
P																
Palatinol AH	6-II	-	-	-	-	-	-	-	1086	-	-	-	-	-	-	-
Palladium (Pd)	1	752	752	-	-	-	754	756	758	-	-	760	762-764	766	-	-
Palladium + Cobalt + ΣX_i . . .	2-II	-	1363	-	-	-	1336-1368	-	-	-	-	-	-	-	-	-
Palladium + Copper + ΣX_i . . .	2-II	-	1370	-	-	-	-	1372	-	-	-	-	-	-	-	-
Palladium + Gold + ΣX_i	2-II	-	1374	-	-	-	1376	-	-	-	-	-	-	-	-	-
Palladium + Nickel	2-I	-	-	-	-	-	391	-	-	-	-	-	-	-	-	-
Palladium + Nickel + ΣX_i . . .	2-II	-	-	-	-	-	-	-	-	-	1378	-	-	-	-	-
Palladium + Uranium	2-I	-	393	-	-	-	-	-	-	-	-	-	-	-	-	-
Palladium aluminides																
PdAl	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Pd_3Al	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Palladium beryllides																
PdBe	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
$PdBe_{12}$	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Palladium brazing alloy GE-76 .	2-II	-	-	-	-	-	-	-	-	-	1376	-	-	-	-	-
Palladium tellurides																
PdTe	6-I	-	-	-	-	-	-	610	-	-	-	-	-	-	-	-
$PdTe_2$	6-I	-	-	-	-	-	-	610	-	-	-	-	-	-	-	-
Panelyte, grade 942	6-II	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-
Paraplex P43	6-II	-	-	-	-	-	-	-	-	-	978	-	-	-	-	-
Penton 1215	6-II	-	1076	-	-	-	-	-	-	-	-	-	-	-	-	-
Perbunan 18	6-II	-	-	-	-	-	-	-	-	1060	-	-	-	-	-	-
Perbunan 26	6-II	-	-	-	-	-	-	-	-	1060	-	-	-	-	-	-
Perbunan 35	6-II	-	-	-	-	-	-	-	-	1060	-	-	-	-	-	-
Periclase	4-I	-	-	-	-	-	-	-	254	-	-	-	-	-	-	-
Periclase, synthetic	4-I	-	-	-	-	-	-	-	254	-	-	-	-	-	-	-
Permanickel 300	2-II	1257	-	-	-	-	-	-	-	-	1303	-	-	-	-	-
Phenacite, synthetic	4-II	-	-	-	-	-	-	-	-	-	1223	-	-	-	-	-
Phenol formaldehyde	6-II	-	-	-	-	-	-	-	-	-	986	-	-	-	-	-
Phenol formaldehyde, asbestos filled	6-II	-	-	-	-	-	-	-	-	-	988	-	-	-	-	-
Phenol formaldehyde, ceramic filled	6-II	-	-	-	-	-	-	-	-	-	990	-	-	-	-	-
Phenol formaldehyde, cord filled	6-II	-	-	-	-	-	-	-	-	-	992	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Phenol formaldehyde, cotton flock filled	6-II	-	-	-	-	-	-	-	-	-	994	-	-	-	-	-
Phenol formaldehyde, fabric filled	6-II	-	-	-	-	-	-	-	-	-	996	-	-	-	-	-
Phenol formaldehyde, stupalith A-2412	6-II	-	-	-	-	-	-	-	-	-	990	-	-	-	-	-
Phenol formaldehyde, wood flour filled	6-II	-	-	-	-	-	-	-	-	-	998	-	-	-	-	-
Phenolic, alpha cellulose paper reinforced	6-II	-	-	-	-	-	-	-	-	-	1105	-	-	-	-	-
Phenolic, cotton fabric reinforced	6-II		-	-	-	-	-	-	-	-	1107	-	-	-	-	-
Phenolic, LMI 304 nylon reinforced	6-II	-	-	-	-	-	1103	-	-	-	-	-	-	-	-	-
Phenolic, long glass fiber reinforced	6-II	-	-	-	-	-	1103	-	-	-	-	-	-	-	-	-
Phenolic and epoxide copolymer resin, reinforced	6-II	-	-	-	-	-	-	-	-	-	1126	-	-	-	-	-
Phenolic novolak	6-II	-	-	-	-	-	982	-	-	-	-	-	-	-	-	-
Phenolic, reinforced	6-II	-	-	-	-	-	1103	-	-	-	1105-1107	-	-	-	-	-
Phenolic resin	6-II	980	-	-	-	-	982	-	984	1082	-	-	-	-	-	-
Phenolic resin, reinforced . . .	6-II	1130	-	-	-	-	-	1132-1146	1148-1156	1159-1170	1172-1179	-	-	-	-	-
Phenolic resin, type S	6-II	980	-	-	-	-	-	-	984	1082	-	-	-	-	-	-
Phenolites																
Phenolite	6-II	-	-	-	-	-	-	-	-	-	1101, 1176	-	-	-		-
NEMA C	6-II	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-
NEMA L	6-II	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-
NEMA LE	6-II	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-
NEMA X	6-II	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-
NEMA XP	6-II	-	-	-	-	-	-	-	-	-	1105	-	-	-	-	-
NEMA XXX	6-II	-	-	-	-	-	-	-	-	-	1105	-	-	-	-	-
NEMA XXXP	6-II	-	-	-	-	-	-	-	-	-	1105	-	-	-	-	-
XXXP	6-II	-	-	-	-	-	-	-	-	-	1105	-	-	-	-	-
Phenyl silane resin	6-II	-	-	-	-	-	-	1074	-	-	-	-	-	-	-	-
Phenyl silane resin, reinforced.	6-II	-	-	-	-	-	-	1212	-	1220	-	-	-	-	-	-
Phenyl silane SC-1013 Monsanto	6-II	-	-	-	-	-	-	1074	-	-	-	-	-	-	-	-
Phosphate glass	4-II	1649	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (pent-)oxide + + Zirconium (di-)oxide. . . .	4-I	-	-	-	-	-	-	-	-	-	787	-	-	-	-	-
Pittsburg no. 3235 glass	4-II	-	-	-	-	-	-	1697	-	-	-	-	1705	1709	1711-1713	-
Plate glass	4-II	1779	-	-	-	-	-	1791	1783	1793	1797	-	-	-	-	-
Plate glass no. 9330.	4-II	-	-	-	-	-	-	1791	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Platinum (Pt)	1	768	768	-	-	-	770	772	774	776	778	780	782-788	790	-	-
Platinum coating on copper . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platinum coating on quartz . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1313	-	-	-
Platinum coating on stainless steel	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1317	1319	-
Platinum + Copper	2-I	-	-	-	-	-	396-397	-	-	-	-	-	1315	-	-	-
Platinum + Iron	2-I	-	-	-	-	-	399	-	-	-	-	-	-	-	-	-
Platinum + Rhodium	2-I	-	-	-	-	-	-	-	403	-	401	-	405	407	-	-
Platinum arsenide (Pt_2As_3) . . .	6-I	-	94	-	-	-	-	-	-	-	-	-	-	-	-	-
Platinum beryllide ($PtBe_{12}$) . .	6-I	158	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platinum stannide (Pt_3Sn) . . .	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Platinum sulfides																
PtS	5	-	-	-	-	-	-	698	-	-	-	-	-	-	-	-
PtS_2	5	-	-	-	-	-	-	698	-	-	-	-	-	-	-	-
Platinum tellurides																
PtTe	6-I	-	-	-	-	-	-	612	-	-	-	-	-	-	-	-
$PtTe_2$	6-I	-	-	-	-	-	-	612	-	-	-	-	-	-	-	-
Plexiglas 11	6-II	-	-	-	-	-	-	-	-	-	1026	-	-	-	-	-
Plexiglas AN-P-44A	6-II	1020	1020	-	-	-	-	1022	1024	-	1025	-	-	-	-	-
Plutonium (Pu)	1	794	792	-	792	-	796	799	-	-	801	-	-	-	-	-
Plutonium + Cerium + ΣX_i . . .	2-II	-	-	-	-	-	-	1380	-	-	-	-	-	-	-	-
Plutonium + Osmium	2-I	409	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium + Thorium	2-I	411	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium beryllide ($PuBe_{13}$) . .	6-I	158	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium bromide ($PuBr_3$) . . .	5	3	3	3	3	3	-	-	-	-	-	-	-	-	-	5
Plutonium carbides																
PuC	5	-	-	-	-	-	110	112	-	-	114	-	-	-	-	-
Pu_2C_3	5	108	-	-	-	-	-	-	-	-	117	-	-	-	-	-
Plutonium chloride ($PuCl_3$) . . .	5	327	327	327	327	327	-	-	-	-	-	-	-	-	-	329
Plutonium ferrides																
$PuFe_2$	6-I	306	306	-	-	-	-	-	-	-	-	-	-	-	-	-
Pu_6Fe	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium fluoride (PuF_3) . . .	5	389	389	389	389	389	-	-	-	-	-	-	-	-	-	391
Plutonium iodide (PuI_3)	5	471	471	471	471	471	-	-	-	-	-	-	-	-	-	473
Plutonium-lead intermetallics ($PuPb_3$)	6-I	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium-manganese intermetallics ($PuMn_2$)	6-I	671	671	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium-nickel intermetallics																
PuNi	6-I	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-
$PuNi_2$	6-I	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-
$PuNi_5$	6-I	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Plutonium nitride (PuN)	5	-	-	-	-	-	-	-	-	-	541	-	-	-	-	-
Plutonium-osmium intermetallics ($PuOs_2$)	6-I	671	671	-	-	-	-	-	-	-	-	-	-	-	-	-
Plutonium oxides																
PuO	4-I	-	-	-	-	323	-	-	-	-	-	-	-	-	-	329
PuO_2	4-I	323	323	-	-	-	-	325	-	-	327	-	-	-	-	329
Plutonium silicide ($PuSi_2$) . . .	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polonium (Po)	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	803
Polybutadiene	6-II	-	-	-	-	-	-	-	-	1066	-	-	-	-	-	-
Polychlorotrifluoroethylene . .	6-II	-	-	-	-	-	-	-	1037	-	1045	-	-	-	-	-
Polyester, glass fiber reinforced	6-II	-	-	-	-	-	-	-	-	-	1109	-	-	-	-	-
Polyester, unsaturated	6-II	-	-	-	-	-	-	-	-	-	968	-	-	-	-	-
Polyester resin, reinforced . .	6-II	1180	-	-	-	-	-	1191	1195-1196	1220	1200	-	-	-	-	-
Po[illegible]lene	6-II	1030	-	-	-	-	-	-	1037	-	1045	-	-	-	-	-
Pol[illegible]ne, halogenated . . .	6-II	1030	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
Polyeth[illegible]e PE 575	6-II	-	1030	-	-	-	-	-	-	-	-	-	-	-	-	-
Polyfluorobutyl acrylate rubber .	6-II	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polyisoprene	6-II	-	-	-	-	-	-	-	-	1066	-	-	-	-	-	-
Polymethyl methacrylate	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polymethyl methacrylate, alumina filled	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polymethyl methacrylate, boron phosphate filled	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polymethyl methacrylate, calcium carbonate filled . . .	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polymethyl methacrylate, silica filled	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polymethyl methacrylate, zinc oxide filled	6-II	-	-	-	-	-	-	-	-	-	1028	-	-	-	-	-
Polypropylene	6-II	1076	1076	-	-	-	-	1078	1080	-	1088	-	-	-	-	-
Polystyrene	6-II	-	1076	-	-	-	-	-	1090	-	1092	-	-	-	-	-
Polystyrene, Grade 912A . . .	6-II	-	-	-	-	-	-	-	-	-	1092	-	-	-	-	-
Polystyrene foam	6-II	-	-	-	-	-	-	-	1090	-	-	-	-	-	-	-
Polytetrafluoroethylene	6-II	-	-	-	-	-	-	1035	1039	-	1045	-	-	-	-	-
Polytetrafluoroethylene laminate	6-II	-	-	-	-	-	-	1214	1218	1220	-	-	-	-	-	-
Polythene, germanium (di-)oxide filled	6-II	-	-	-	-	-	-	-	-	-	1041	-	-	-	-	-
Polythene, iron(ic) oxide filled .	6-II	-	-	-	-	-	-	-	-	-	1041	-	-	-	-	-
Polythene, scandium oxide filled	6-II	-	-	-	-	-	-	-	-	-	1041	-	-	-	-	-
Polythene PM-1	6-II	-	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
Polyurethane foam	6-II	962	-	-	-	-	-	-	964	-	966	-	-	-	-	-
Polyvinyl carbazole	6-II	-	-	-	-	-	-	970	972	-	-	-	-	-	-	-
Polyvinyl chloride	6-II	-	1076	-	-	-	-	-	1086	-	-	-	-	-	-	-

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Polyvinyl chloride, cellular . .	6-II	-	-	-	-	-	-	-	1066	-	-	-	-	-	-	-
Porcelain	5	1003	-	-	-	-	1005-1013	1015	1017	-	1019-1021	-	-	-	-	-
Porcelain 7A2	5	-	-	-	-	-	-	-	1017	-	-	-	-	-	-	-
Porcelain 576	5	1003	-	-	-	-	-	-	1017	-	-	-	-	-	-	-
Porcelain, aluminum oxide. . .	5	1003	-	-	-	-	-	1015	1017	-	-	-	-	-	-	-
Porcelain, cone 14	5	-	-	-	-	-	1007	-	-	-	-	-	-	-	-	-
Porcelains, electrical																
K-3 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
K-5 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
K-6 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
K-7 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
K-8 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
K-9 body	5	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-
Li-K-1 body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Li-K-2a body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Li-K-2b body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Li-K-2c body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Li-K-2d body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Li-K-2e body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Lithium modified	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Pelalite body	5	-	-	-	-	-	1011	-	-	-	-	-	-	-	-	-
Porcelain, feldspar, dinnerware cone 12-14	5	-	-	-	-	-	1007	-	-	-	-	-	-	-	-	-
Porcelain, zircon	5	1003	-	-	-	-	1013	-	1017	-	1021	-	-	-	-	-
Potassium aluminum silicates .	4-II	-	-	-	-	-	-	-	-	-	1316-1318	-	-	-	-	-
Potassium aluminum silicate + + Iron(ic) oxide	4-II	-	-	-	-	-	-	1573	-	-	-	-	-	-	-	-
Potassium borate glass . .	4-II	1605	-	-	-	-	1607	-	-	-	-	-	-	-	-	-
Potassium bromide (KBr) . . .	5	-	-	-	-	-	-	-	-	-	-	-	-	7	-	-
Potassium chloride (KCl) . . .	5	-	-	-	-	-	-	-	-	-	-	-	-	331	-	-
Potassium feldspar	4-II	-	-	-	-	-	-	-	-	-	1316-1318	-	-	-	-	-
Potassium fluoride + Lithium fluoride	5	-	-	-	-	-	-	409	-	-	-	-	-	-	-	-
Potassium mica	5	-	-	-	-	-	-	-	-	-	1001	-	-	-	-	-
Potassium sodium aluminum silicates	4-II	-	-	-	-	-	-	-	-	-	1320	-	-	-	-	-
Potassium uranate ($K_2O \cdot UO_3$) .	4-II	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium lead silicate glass. .	4-II	-	-	-	-	-	1777	-	-	-	-	-	-	-	-	-
Potassium silicate glass	4-II	-	-	-	-	-	-	-	-	-	1775	-	-	-	-	-
Praseodymium (Pr)	.	805	805	805	805	-	807	809	-	-	-	-	-	-	-	811
Praseodymium + ΣX_i	2-II	-	1382	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Praseodymium + Magnesium . .	3-I	413	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium + Neodymium . .	2-I	-	-	-	-	-	-	-	-	-	415	-	-	-	-	-
Praseodymium + Silicon	2-I	-	-	-	-	-	-	417	-	-	-	-	-	-	-	-
Praseodymium aluminides																
PrAl	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrAl_2$	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrAl_4$	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_3Al_2	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-bismuth intermetallics (PrBi)	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium borides																
PrB_4	6-I	296	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PrB_6	6-I	295-296	-	-	-	-	300	-	-	-	-	-	-	-	-	-
Praseodymium bromide ($PrBr_3$)	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-cadmium intermetallics																
PrCd	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCd_2$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCd_3$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCd_{11}$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium carbides																
PrC_2	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium chloride ($PrCl_3$).	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-cobalt intermetallics																
$PrCo_2$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCo_5$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-copper intermetallics																
PrCu	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCu_2$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCu_4$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrCu_6$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-gallium intermetallics ($PrGa_2$)	6-I	673	-		-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium germanides																
PrGe	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrGe_2$	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-gold intermetallics																
PrAu	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrAu_2$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Praseodymium-gold intermetallics (cont.)																
$PrAu_3$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2Au	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium hydride (PrH_2) .	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-indium intermetallics																
$PrIn_3$	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_3In	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-lead intermetallics																
PrPb	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrPb_3$	6-I	673	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2Pb	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-magnesium intermetallics																
PrMg	6-I	673	674	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrMg_2$	6-I	673	674	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrMg_3$	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_4Mg	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-mercury intermetallics (PrHg)	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-nickel intermetallics ($PrNi_2$)	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-osmium intermetallics ($PrOs_2$)	6-I	673	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium oxides																
$PrO_{1.78-1.88}$	4-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_6O_{11}	4-I	-	-	-	-	-	-	331	-	-	333	-	-	-	-	335
Praseodymium phosphide (PrP).	5	635	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium selenides																
PrSe	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2Se_3	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_3Se_4	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium silicides ($PrSi_2$).	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-silver intermetallics																
PrAg	6-I	673	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrAg_2$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrAg_3$	6-I	-	673	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium stannides																
$PrSn_3$	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2Sn	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2Sn_3	6-I	-	541	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Praseodymium sulfides																
PrS	5	700	-	-	-	-	-	-	-	-	702	-	-	-	-	-
PrS_2	5	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_2S_3	5	700	-	-	-	-	-	-	-	-	702	-	-	-	-	-
Pr_3S_4	5	700	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium-thallium intermetallics																
$PrTl$	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
$PrTl_3$	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Pr_3Tl	6-I	-	674	-	-	-	-	-	-	-	-	-	-	-	-	-
Promethium (Pm)	1	-	813	813	-	813	-	-	-	-	-	-	-	-	-	-
Protactinium (Pa)	1	815	815	-	-	-	-	-	-	-	-	-	-	-	-	-
Protactinium oxide (PaO)	4-I	337	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Protoenstatite	4-II	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-
Pu-Ce-Co eutectic alloy	2-II	-	-	-	-	-	-	1380	-	-	-	-	-	-	-	-
Pyrex 774	4-II	1693	-	-	-	-	-	-	1699	1701	1703	-	1707	1709	1713	-
Pyrex 7740	4-II	-	-	-	-	-	-	1697	-	1701	-	-	1705	1709	1711-1713	-
Pyrex glasses	4-II	1693	-	-	-	-	-	1697	1699	1701	1703	-	1705-1707	1709	1711-1713	-
Pyrocerams																
Pyroceram 9606	4-II	-	-	-	-	-	-	1587	1589	1591	-	-	1593-1599	1601	1603	-
Pyroceram 9608	4-II	-	-	-	-	-	-	1587	1589	1591	-	-	1593-1599	1601	1603	-
Pyroceram 9690	4-II	-	-	-	-	-	-	-	-	1591	-	-	-	-	-	-
Pyrolytic carbon	1	83	-	-	-	-	-	-	69	-	-	-	-	-	-	-
Pyrolytic carbon EYX-4	1	-	-	-	-	-	-	-	69	-	-	-	-	-	-	-
Pyrolytic graphite	1	-	-	-	-	-	-	-	317	-	319	-	325-331	333-335	-	-
Pyrolytic graphite coating on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1297-1299	-	-	-
Pyrolytic graphite + Zirconium (pyro-) carbide	5	-	-	-	-	-	-	-	-	-	745	-	-	-	-	-
Q																
Quartz	4-I	353	353	-	-	-	355	357	361	365	-	-	-	379	381	-
Quartz coated with magnesium fluoride	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1425	1427	-
Quartz coated with platinum	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1317	1319	-
Quartz glass	4-II	1651	-	-	-	-	1653	1655	1657	-	-	-	-	-	-	-

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R																
Rene 41	2-II	1122	-	-	-	-	-	1139	1134	-	1156	-	1184, 1198	1211	-	-
Resimene 814 resin	6-II	-	1014	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium (Re)	1	817	817	-	-	817	820	822	824	-	826	-	828-832	-	-	834
Rhenium + Tungsten	2-I	-	419	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium arsenide (Re_3As_7) . . .	6-I	-	-	-	-	-	96	-	-	-	-	-	-	-	-	-
Rhenium phosphide (ReP) . . .	5	-	635	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium selenide ($ReSe_2$) . . .	6-I	-	-	-	-	-	349	-	351	-	-	-	-	-	-	-
Rhenium silicides																
ReSi	6-I	-	461	-	-	-	-	-	-	-	463	-	-	-	-	465
$ReSi_2$	6-I	-	461	-	-	-	-	-	-	-	463	-	-	-	-	465
Re_3Si	6-I	-	461	-	-	-	-	-	-	-	-	-	-	-	-	465
Rhodium (Rh)	1	835	836	-	-	-	838	840	842	-	-	-	844-848	856	-	-
Rhodium germanides																
RhGe	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rh_2Ge	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rh_5Ge_4	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rh_5Ge_3	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rokide A coating on AISI 446 . .	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1361	-	-
Rokide C coating on titanium alloy 6 Al - 4 V	6-II	-	-	-	-	-	-	-	-	-	-	-	1345-1347	-	-	-
Rubbers																
Board no. 2266, cellular . .	6-II	-	-	-	-	-	-	-	1056	-	-	-	-	-	-	-
Buna	6-II	1051	-	-	-	-	-	1054	1056	1066	-	-	-	-	-	-
Dielectric mix	6-II	-	-	-	-	-	-	-	1056	-	-	-	-	-	-	-
Natural	6-II	1051	-	-	-	-	-	-	1056	1058	1068	-	-	-	-	-
Perbunan	6-II	1051	-	-	-	-	-	1054	1056	1060	-	-	-	-	-	-
Silicone	6-II	-	-	-	-	-	-	-	-	1064	1065	-	-	-	-	-
Synthetic	6-II	1051	-	-	-	-	-	1054	1056	1060-1066	1068	-	-	-	-	-
Rubidium fluoride (RbF)	5	-	-	-	-	-	-	393	-	-	-	-	-	-	-	395
Ruthenium (Ru)	1	852	852	-	-	852	854	856	858	-	-	-	-	-	-	860
Ruthenium-tungsten intermetallics (Ru_2W_3)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Rutile	4-I	445	-	-	-	-	450	454	460	-	462	-	-	-	-	-

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S																
SAE 1006	3	-	-	-	-	-	-	-	-	322	-	-	-	-	-	-
SAE 1010	3	310	-	-	-	-	312	316	325	329	335	-	-	-	-	-
SAE 1018	3	-	-	-	-	-	-	-	-	333	-	-	-	-	-	-
SAE 1030	3	-	-	-	-	-	-	-	-	329	-	-	345-347	-	-	-
SAE 1045	3	-	-	-	.	-	-	-	-	333	-	-	-	-	-	-
SAE 3140	3	-	-	.	-	-	-	-	-	365	-	-	-	-	-	-
SAE 4130	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
SAE 4340	3	-	-	-	-	-	-	-	397	395	-	-	-	-	-	-
SAE 8630	3	-	-	-	-	-	-	-	-	-	337	-	-	-	-	-
Samaria	4-I	339	339	-	-	-	-	341	-	-	343	-	345	-	-	-
Samarium (Sm)	1	862	852	862	862	862	864	866	-	-	-	-	-	-	-	-
Samarium-bismuth intermetallics (SmBi)	6-I	651	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium borides																
SmB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SmB_6	6-I	295	296	-	-	-	300	-	-	-	302	-	-	-	-	-
Samarium-cadmium intermetallics																
SmCd	6-I	681	-	-	-	-	-	-	-		-	-	-	-	-	-
$SmCd_2$	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$SmCd_{11}$	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium carbides																
SmC_2	5	294	294	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium-cobalt intermetallics																
$SmCo_2$	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$SmCo_5$	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium ferrides																
$SmFe_2$	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$SmFe_3$	5-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium-gallium intermetallics ($SmGa_3$)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium germanide ($SmGe_2$)	6-I	323	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium hydrides																
SmH_2	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SmH_3	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium-indium intermetallics ($SmIn_3$)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium-lead intermetallics ($SmPb_3$)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium-mercury intermetallics (SmHg)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Samarium-nickel intermetallics																
$SmNi_2$	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$SmNi_5$	6-I	531	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium (sesqui-)oxide (Sm_2O_3)	4-I	339	339	-	-	-	-	341	-	-	343	-	345	-	-	-
Samarium (sesqui-)oxide + + Gadolinium oxide	4-I	-	-	-	-	-	-	-	753	-	-	-	-	-	-	-
Samarium (sesqui-)oxide + + Gadolinium oxide + + Dysprosium oxide + Yttrium oxide	4-I	785	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium phosphide (SmP) . .	5	525		-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium selenides (SmSe) . .	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium silicides ($SmSi_2$) . .	6-I	523	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium sulfides																
$SmS_{1.35}$	5	-	-	-	-	-	706	-	-	-	-	-	-	-	-	-
SmS	5	704	704	-	-	-	-	-	708	-	-	-	-	-	-	-
SmS_2	5	-	704	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm_2S_3	5	704	704	-	-	-	-	-	-	-	-	-	-	-	-	-
Sm_3S_4	5	704	704	-	-	-	-	-	-	-	-	-	-	-	-	-
Sandwich panels, TAC-polyester skin and alkyd isocyanate foam core	6-II	-	-	-	-	-	-	1257	1259	-	-	-	-	-	-	-
Sapphire	4-I	41	41	-	-	-	43	5	45	-	47	-	-	-	-	-
Sapphire, synthetic	4-I	41	-	-	-	-	-	5	45	-	47	-	-	-	-	-
Scandia	4-I	347	347	-	-	-	-	349	-	-	351	-	-	-	-	-
Scandium (Sc)	1	964	966	968	968	968	970	972	-	-	974	-	-	-	-	976
Scandium boride (ScB_2)	6-I	204	204	-	-	-	-	-	-	-	206	-	-	-	-	-
Scandium carbide (ScC)	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scandium nitride (ScN)	5	621	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scandium oxide (Sc_2O_3)	4-I	347	347	-	-	-	-	349	-	-	351	-	-	-	-	-
Scandium selenide (Sc_2Se_3) . . .	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scandium sulfide (Sc_2S_3)	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scandium telluride (Sc_2Te_3) . .	6-I	636	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Selectron 209	6-II	1830	-	-	-	-	-	-	-	-	1336	-	-	-	-	-
Selectron 5026	6-II	-	-	-	-	-	-	-	-	-	363	-	-	-	-	-
SI 142 silicon	1	-	-	-	-	-	-	-	-	890	-	-	-	-	-	-
Silastic 140	6-II	-	-	-	-	-	-	-	-	1664	1668	-	-	-	-	-
Silastic 150	6-II	-	-	-	-	-	-	-	-	1664	-	-	-	-	-	-
Silica	4-I	353	353	-	-	-	355	357	359	363	367	-	373-375	377	-	-
Silica fabric	6-II	-	-	-	-	-	-	-	-	1277	-	-	-	-	-	-
Silica glass	4-II	1651	1651	-	-	-	1653	1655	1657	1659-1662	1663	-	1665-1667	1669	1671-1673	-
Silica rock	4-I	530, 536	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Silicide coating on molybdenum .	6-II	-	-	-	-	-	-	-	-	-	-	-	1467-1469	1471	-	-
Silicide coating on tantalum. . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1473-1475	1477	-	-
Silicide coating on titanium. . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1479-1481	1483	-	-
Silicide coating on tungsten. . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1485-1487	1489	-	-
Silicon (Si)	1	878	878	878	-	878	880-884	886	888	890	892	-	894-896	898	-	-
Silicon + ΣX_i	2-II	-	-	-	-	-	1384	1386	-	-	-	-	-	-	-	-
Silicon + Germanium	2-I	421	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon + Iron	2-I	-	-	-	-	-	-	423	425	-	427	-	-	-	-	-
Silicon alloys (special designations)																
Leboite	2-I	-	-	-	-	-	-	-	-	-	427	-	-	-	-	-
Silicon borides																
SiB_4	6-I	-	-	-	-	-	-	-	-	-	210	-	-	-	-	-
SiB_6	6-I	-	208	-	-	-	-	-	-	-	210	-	-	-	-	-
Silicon carbides																
(SiC)	5	119	119	-	-	-	121	123	125-127	-	129	-	131-135	137-139	-	-
Norton RC-4237	5	-	-	-	-	-	-	-	-	-	-	-	311	-	-	-
Silicon carbide coating on niobium-zirconium alloys . . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1415	-	-	-
Silicon carbide coating on tantalum	6-II	-	-	-	-	-	-	-	-	-	-	-	1411-1413	-	-	-
Silicon carbide + Boron carbide .	5	297	-	-	-	-	-	-	-	-	299	-	-	-	-	-
Silicon carbide + Carbon	5	-	-	-	-	-	-	807	-	-	809	-	811	-	-	-
Silicon carbide + Graphite . . .	5	-	-	-	-	-	-	813	-	-	-	-	-	-	-	-
Silicon carbide + Graphite + Silicon	5	-	-	-	-	-	-	815	817	-	-	-	-	-	-	-
Silicon carbide + Magnesium oxide + Nickel aluminide cermet	6-II	-	-	-	-	-	-	-	-	-	854	-	-	-	-	-
Silicon carbide + Silicon	5	-	-	-	-	-	-	819	-	-	-	-	821	-	-	-
Silicon carbide + Silicon cermet.	6-II	-	-	-	-	-	-	-	856	-	-	-	-	-	-	-
Silicon carbide + Silicon nitride .	5	-	-	-	-	-	-	-	-	-	823	-	-	-	-	-
Silicon carbide + (Tetr-) boron carbide	5	297	-	-	-	-	-	-	-	-	299	-	-	-	-	-
Silicon carbide + ΣX_i	5	-	-	-	-	-	-	-	307	-	-	-	309-311	-	-	-
Silicon carbide foam	5	-	-	-	-	-	-	-	127	-	129	-	-	-	-	-
Silicon germanide (SiGe)	6-I	-	-	-	-	-	-	405	-	-	-	-	-	-	-	-
Silicon oxides																
SiO	4-I	-	-	-	-	-	-	-	-	-	-	-	371	-	-	-

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Silicon oxides (cont.)																
SiO_2	4-I	353	353	-	-	-	355	357	359-361	363-365	367-369	-	373-375	377-379	381	-
Silicon (di-)oxide coating on aluminum	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1391	-	-
Silicon (di-)oxide foam	4-I	-	-	-	-	-	-	-	-	-	369	-	-	-	-	-
Silicon (mon-)oxide coating on aluminum	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1389	-	-
Silicon (di-)oxide + ΣX_i	4-I	826	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (di-)oxide + Aluminum cermet	6-II	-	-	-	-	-	-	-	-	-	790	-	-	-	-	-
Silicon (di-)oxide + Aluminum oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	-	796	-	-	-	-	-	-
Silicon (di-)oxide + Aluminum oxide	4-I	-	-	-	-	-	-	-	-	789	792	-	794	-	-	-
Silicon (di-)oxide + Aluminum oxide + Iron(ic) oxide	4-I	-	-	-	-	-	-	-	798	800	802-812	-	-	-	-	-
Silicon (di-)oxide + Aluminum oxide + Iron(ic) oxide + + Magnesium oxide + Potassium (mon-)oxide	4-I	-	-	-	-	-	-	-	814	-	-	-	-	-	-	-
Silicon (di-)oxide + Calcium oxide	4-I	-	-	-	-	-	-	-	816	818	-	-	-	-	-	-
Silicon (di-)oxide + Iron(ic) oxide	4-I	820	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon (di-)oxide + Molybdenum (di-)silicide	5	-	-	-	-	-	-	-	-	-	-	-	783-785	787	-	-
Silicon (di-)oxide + Titanium (di-)oxide	4-I	-	-	-	-	-	822	-	-	-	824	-	-	-	-	-
Silicon nitride (Si_3N_4)	5	543	543	-	-	-	-	545	547	-	549	-	551-553	555	-	-
Silicon nitride + Silicon carbide.	5	840	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon telluride (SiTe).	6-I	614	614	-	-	-	616	-	640	-	-	-	-	-	-	-
Silicone DC-301	6-II	-	-	-	-	-	1113	-	-	-	-	-	-	-	-	-
Silicone GMGA 5003	6-II	-	-	-	-	-	1070	-	-	-	-	-	-	-	-	-
Silicone coating on Inconel . . .	6-II	-	-	-	-	-	1495	-	-	-	-	-	-	-	-	-
Silicone, filled	6-II	-	-	-	-	-	1070	-	-	-	-	-	-	-	-	-
Silicone, reinforced.	6-II	-	-	-	-	-	1113	-	-	-	-	-	-	-	-	-
Silicone foams																
Silicone foam R-7001.	6-II	1084	-	-	-	-	-	-	1080	-	-	-	-	-	-	-
Silicone foam R-7002.	6-II	1084	-	-	-	-	-	1072	1080	-	-	-	-	-	-	-
Silicone foam R-7091.	6-II	1084	-	-	-	-	-	-	1080	-	-	-	-	-	-	-
Silicone resin	6-II	-	-	-	-	-	-	1072	-	-	-	-	-	-	-	-
Silicone resin, reinforced . . .	6-II	1204	-	-	-	-	-	1206	1208, 1218	1220	1210	-	-	-	-	-
Sillimanite	4-II	-	-	-	-	-	-	1189	-	-	1195	-	1199	-	-	-

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Silver (Ag)	1	900	900	900	900	900	902	904	906	-	908	910	912-914	916-920	-	922
Silver coated with silver sulfide.	6-II	-	-	-	-	-	-	-	-	-	-	1433	1435	-	-	-
Silver coating on mylar	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1325	-	-
Silver lume	1	-	-	-	-	-	-	-	-	-	-	910	-	-	-	-
Silver + Aluminum	2-I	431	-	-	-	429	433	-	-	-	-	-	-	-	-	-
Silver + Cadmium	2-I	-	-	-	-	-	-	-	435	-	-	-	-	437	-	439
Silver + Copper	2-I	-	-	-	-	-	-	-	-	-	441	-	-	-	-	-
Silver + Gold	2-I	-	-	-	-	-	-	-	-	-	443	-	-	-	-	445
Silver + Lead	2-I	-	-	-	-	-	-	-	-	-	447	-	-	-	-	-
Silver + Magnesium	2-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	449
Silver + Manganese	2-I	-	-	-	-	-	451	-	-	-	-	-	-	-	-	-
Silver + Palladium	2-I	-	-	-	-	-	458	-	-	-	-	-	-	-	-	-
Silver + Platinum	2-I	-	-	-	-	-	455	-	-	-	-	-	-	-	-	-
Silver + Zinc	2-I	459	457	457	-	-	-	-	-	-	-	-	-	461	-	-
Silver antimony telluride ($AgSbTe_2$)	6-I	-	-	-	-	-	620	-	-	622	-	-	-	-	-	-
Silver antimony telluride + + Germanium telluride	6-I	-	-	-	-	-	719	-	-	-	-	-	-	-	-	-
Silver antimony telluride + + Tin telluride	6-I	-	-	-	-	-	-	-	721	-	-	-	-	-	-	-
Silver beryllide ($AgBe_{12}$). . . .	6-I	158	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver bromide (AgBr).	5	-	-	-	-	-	-	-	-	9	-	-	-	-	-	-
Silver indium telluride ($AgInTe_2$)	6-I	-	-	-	-	-	624	-	640	-	-	-	-	-	-	-
Silver oxide (Ag_2O)	4-I	-	-	-	-	-	-	383	-	-	-	-	-	-	-	-
Silver plated AISI 321	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1321	-	-
Silver selenide (Ag_2Se)	6-I	-	-	-	-	-	-	353	355	-	-	-	-	-	-	-
Silver sulfide (Ag_2S).	5	-	-	-	-	-	-	710	-	-	-	-	-	-	-	-
Silver sulfide coating on silver .	6-II	-	-	-	-	-	-	-	-	-	-	1431	1433	-	-	-
Silver telluridos (Ag_2Te)	6-I	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-
Soda lime glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1809	1811	1613-1815	-
Soda lime aluminosilicate glass.	4-II	-	-	-	-	-	1817	-	-	-	-	-	-	-	-	-
Soda-lime silicate glass	4-II	-	-	-	-	-	-	1791	1795	1793	1797	-	1799	1801	-	-
Soda lime glass LOF.	4-II	-	-	-	-	-	-	-	-	-	-	-	1809	1811	1813-1815	-
Sodium aluminum borate glass .	4-II	-	-	-	-	-	-	-	-	-	1527	-	-	-	-	-
Sodium aluminum silicates ($Na_2O \cdot Al_2O_3 \cdot 4\ SiO_2$)	4-II	-	-	-	-	-	-	1324	-	-	1326	-	-	-	-	-
Sodium barium silicate glass . .	4-II	-	-	-	-	-	-	-	-	-	1789	-	-	-	-	-
Sodium beryllium borate glass .	4-II	-	-	-	-	-	-	-	-	-	1629	-	-	-	-	-
Sodium borate glass	4-II	-	-	-	-	-	1607	-	-	-	-	-	-	-	-	-
Sodium borosilicate glass . . .	4-II	-	-	-	-	-	-	-	-	-	1721	-	-	-	-	-

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Sodium calcium silicate ($Na_2O \cdot CaO \cdot SiO_2$)	4-II	-	-	-	-	-	-	1328	-	-	-	-	-	-	-	-
Sodium calcium silicate glass. .	4-II	-	-	-	-	-	-	1791	1795	1793	1797	-	1799	1801	-	-
Sodium ferrite ($Na_2O \cdot Fe_2O_3$) . .	4-II	-	-	-	-	-	-	1097	-	-	-	-	-	-	-	-
Sodium fluoride + Beryllium ferride cermet	6-II	-	-	-	-	-	-	-	911	.	-	-	-	-	-	-
Sodium fluoride + Zirconium fluoride + Uranium (tetra-) fluoride	5	-	-	-	-	-	-	411	-	-	-	-	-	-	-	-
Sodium lead silicate glass . . .	4-II	-	-	-	-	-	1819	-	-	-	1803	-	-	-	-	-
Sodium magnesium borate glass.	4-II	-	-	-	-	-	-	-	-	-	1631	-	-	-	-	-
Sodium magnesium silicate glass	4-II	-	-	-	-	-	-	-	-	-	1805	-	-	-	-	-
Sodium magnesium copper silicate glass	4-II	-	-	-	-	-	-	-	-	-	1807	-	-	-	-	-
Sodium manganese telluride ($Na_xMn_{1-x}Te$)	6-I	-	-	-	-	-	626	-	628	-	-	-	-	-	-	-
Sodium molybdates																
$Na_2O \cdot MoO_3$	4-II	-	-	-	-	-	-	1119	-	-	-	-	-	-	-	-
$Na_2O \cdot 2\ MoO_3$	4-II	-	-	-	-	-	-	1119	-	-	-	-	-	-	-	-
Sodium (mon-)oxide (Na_2O) . .	4-I	-	-	-	-	-	-	385	-	-	-	-	-	-	-	-
Sodium phosphorus uranate ($2\ NaO \cdot UO_3 \cdot P_2O_5$).	4-II	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium potassium aluminum silicates	4-II	-	-	-	-	-	-	-	-	-	1330	-	-	-	-	-
Sodium potassium borosilicate glass	4-II	-	.	-	-	-	-	-	-	-	1723	-	-	-	-	-
Sodium silicates																
$Na_2O \cdot SiO_2$	4-II	-	-	-	-	-	-	1322	-	-	-	-	-	-	-	-
$Na_2O \cdot 2\ SiO_2$	4-II	-	-	-	-	-	-	1322	-	-	-	-	-	-	-	-
Sodium silicate glass	4-II	1779	-	-	-	-	1781	-	1783	-	1785-1787	-	-	-	-	-
Sodium silicate glass no. 23 . .	4-II	-	-	-	-	-	-	1791	-	-	-	-	-	-	-	-
Sodium strontium alumino-silicate glass	4-II	-	-	-	-	-	-	-	-	-	1821	-	-	-	-	-
Sodium tellurate ($Na_2O \cdot TeO_3$) .	4-II	-	-	-	-	-	-	1366	-	-	-	-	-	-	-	-
Sodium titanates																
$Na_2O \cdot TiO_2$	4-II	-	-	-	-	-	-	1454	-	-	-	-	-	-	-	-
$Na_2O \cdot 2\ TiO_2$	4-II	-	-	-	-	-	-	1454	-	-	-	-	-	-	-	-
$Na_2O \cdot 3\ TiO_2$	4-II	-	-	-	-	-	-	1454	-	-	-	-	-	-	-	-
Sodium tungstates																
$Na_2O \cdot WO_3$	4-II	-	-	-	-	-	-	1480	-	-	-	-	-	-	-	-
$Na_2O \cdot 2\ WO_3$	4-II	-	-	-	-	-	-	1480	-	-	-	-	-	-	-	-
Sodium tungsten oxide (Na_xWO_3).	4-II	-	-	-	-	-	-	-	-	-	1155	-	-	-	-	-
Sodium uranate ($Na_2O \cdot UO_3$) . .	4-II	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-

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Sodium vanadates																
$Na_2O \cdot V_2O_5$	4-II	-	-	-	-	-	-	1494	-	-	-	-	-	-	-	-
$2\ Na_2O \cdot V_2O_5$	4-II	-	-	-	-	-	-	1494	-	-	-	-	-	-	-	-
$3\ Na_2O \cdot V_2O_5$	4-II	-	-	-	-	-	-	1494	-	-	-	-	-	-	-	-
Sodium zinc borosilicate glass .	4-II	-	-	-	-	-	-	-	-	-	1725	-	-	-	-	-
Solex 2808 plate glass	4-II	1779	-	-	-	-	-	1791	1783	1793	1797	-	-	-	-	-
Solex "S" plate glass.	4-II	1779	-	-	-	-	-	1791	1783	1793	1797	-	-	-	-	-
Spektralkoĉle artificial graphite.	1	-	-	-	-	-	-	-	360	-	-	-	-	-	-	-
Spinal, magnesium aluminate . .	4-II	1007	1007	-	-	-	1009	1011	1013	1015	1017	-	-	-	-	-
Spinal, magnesium aluminate, with sodium (mon-)oxide . . .	4-II	-	-	-	-	-	-	1524	1526	1528	1530	-	-	-	-	-
Spinal, magnesium chromite . .	4-II	-	-	-	-	-	-	-	-	-	1059	-	-	-	-	-
Spinal, nickel ferrite	4-II	-	-	-	-	-	-	1089	-	-	-	-	-	-	-	-
Spinal, zinc chromate	4-II	-	-	-	-	-	-	-	-	-	1063	-	-	-	-	-
Spodumene	4-II	-	-	-	-	-	-	-	1266	-	1270	-	-	-	-	-
Sponge zirconium	1	-	-	-	-	-	1102	-	1106	-	-	-	-	-	-	-
. . . . . .	2-I	-	-	-	-	-	699	-	-	-	-	-	-	-	-	-
Stafoam 604	6-II	-	-	-	-	-	-	-	964	-	-	-	-	-	-	-
Stainless steel coated with NBS coating A-418	6-II	-	-	-	-	-	-	-	-	-	-	-	1365-1367	-	-	-
Stainless steel coated with NBS coating N-143	6-II	-	-	-	-	-	-	-	-	-	-	-	1357-1359	-	-	-
Stainless steel coated with platinum	6-II	-	-	-	-	-	-	-	-	-	-	-	131[illegible]	-	-	-
Steatite	4-II	1285	-	-	-	-	1287	-	1293	-	1295	-	-	-	-	-
Steatite, ultra-	4-II	-	-	-	-	-	1287	-	-	-	-	-	-	-	-	-
Steatite 10B-2	4-II	-	-	-	-	-	-	-	1293	-	-	-	-	-	-	-
Steatite 12C-2	4-II	-	-	-	-	-	-	-	1293	-	-	-	-	-	-	-
Steatite, grade L-4, AlSiMag 196	4-II	-	-	-	-	-	1287	-	-	-	-	-	-	-	-	-
Steatite, grade L-5, Pass and Seymour E-211-M	4-II	-	-	-	-	-	1287	-	-	-	-	-	-	-	-	-
Steels (special designations)																
1 Kh18N9T	3	-	-	-	-	-	-	161	-	-	215	-	-	-	-	-
1.1 C tool steel	3	-	-	-	-	-	-	-	-	14	-	-	-	-	-	-
4 Kh13	3	-	-	-	-	-	-	73	-	-	-	-	-	-	-	-
12 MoV	3	-	-	-	-	-	-	-	-	-	104	-	-	-	-	-
15 KhM	3	-	-	-	-	-	-	-	-	-	100	-	-	-	-	-
17-4 PH	3	145	-	-	-	-	-	157	170	-	199	-	-	-	-	-
17-5 MnV	3	-	-	-	-	-	-	-	-	-	116	-	-	-	-	-
17-7 PH	3	140	-	-	-	-	-	159	172	-	199, 203	231	255, 259, 270	282	-	-
17-10 P	3	-	-	-	-	-	-	-	-	-	227	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Steels (cont.)																
18-8	3	-	-	-	-	-	-	-	-	-	-	-	236, 241	-	-	-
18-8 Cr-Cu	3	-	-	-	-	-	-	-	-	-	-	-	-	138	-	-
18-20 Cr-Mn	3	-	-	-	-	-	-	-	-	-	-	-	-	348	-	-
18-21 Cr-Co	3	-	-	-	-	-	-	-	-	-	-	-	-	302	-	-
19-9 DL	3	-	-	-	-	-	-	-	-	189	211	-	-	-	-	-
19-9 DX	3	-	-	-	-	-	-	-	-	-	225	-	-	-	-	-
25 D 245	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
815	3	310	-	-	-	-	-	-	-	-	340	-	-	-	-	-
A-286	3	379	-	-	-	-	-	-	391	397	401	-	409-411	413	-	-
AISI steels (see AISI designations)																
Allegheny 18-8 M	3	-	-	-	-	-	149	-	-	-	-	-	-	-	-	-
Allegheny steels	3	-	-	-	-	-	-	-	-	-	-	-	257	-	-	-
AM350	3	-	-	-	-	-	-	-	170	-	199	221	236, 259, 268	280	-	-
AM355	3	-	-	-	-	-	-	157	170	-	199	-	-	-	-	-
AMS 2713	3	-	-	-	-	-	-	-	385	-	-	-	-	-	-	-
AMS 2714	3	-	-	-	-	-	-	-	387	-	-	-	-	-	-	-
ATS	3	140	-	-	-	-	-	-	-	-	221	-	-	-	-	-
B-759	3	-	-	-	-	-	-	-	-	-	106	-	-	-	-	-
Carbon steel ASTM A105 grade II	3	-	-	-	-	-	-	-	-	-	337	-	-	-	-	-
Cor-ten	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
DVL 4/V 869	3	-	-	-	-	-	-	-	-	-	403	-	-	-	-	-
DVL 30	3	140	-	-	-	-	-	-	-	-	225	-	-	-	-	-
DVL 31	3	-	-	-	-	-	-	-	-	-	403	-	-	-	-	-
DVL 46	3	140	-	-	-	-	-	-	-	-	217	-	-	-	-	-
DVL 47	3	140	-	-	-	-	-	-	-	-	217	-	-	-	-	-
DVL 48	3	-	-	-	-	-	-	-	-	-	217	-	-	-	-	-
DVL 49	3	140	-	-	-	-	-	-	-	-	217	-	-	-	-	-
DVL 50	3	140	-	-	-	-	-	-	-	-	217	-	-	-	-	-
DVL 51	3	140	-	-	-	-	-	-	-	-	227	-	-	-	-	-
DVL 52	3	140	-	-	-	-	-	-	-	-	225	-	-	-	-	-
EI-257	3	-	-	-	-	-	-	155	-	-	-	-	-	-	-	-
EI-572	3	-	-	-	-	-	-	-	178	-	215	-	-	-	-	-
EI-606	3	-	-	-	-	-	-	-	172	-	215	-	-	-	-	-
EI-783	3	-	-	-	-	-	-	-	-	-	215	-	-	-	-	-
EI-802	3	-	-	-	-	-	-	-	-	-	104	-	-	-	-	-
EI-855	3	-	-	-	-	-	-	383	394	397	-	-	-	-	-	-
EME	3	-	-	-	-	-	-	-	-	-	225	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Steels (cont.)																
En 8	3	-	-	-	-	-	312	-	325	-	-	-	-	-	-	-
En 19	3	-	-	-	-	-	61	-	83	-	-	-	-	-	-	-
En 31	3	-	-	-	-	-	61	-	83	-	-	-	-	-	-	-
FCM	3	311	-	-	-	-	-	-	-	-	341	-	-	-	-	-
Feni 36	3	-	-	-	-	-	-	-	-	-	369	-	-	-	-	-
G 17	3	-	-	-	-	-	-	-	391	-	-	-	-	-	-	-
GX 4881	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
Haynes alloy no. 90	3	-	-	-	-	-	-	-	-	-	106	-	-	-	-	-
Haynes alloy no. 93	3	-	-	-	-	-	-	-	-	-	106	-	-	-	-	-
HF grade	3	-	141	-	-	-	-	-	-	-	195	-	-	-	-	-
H. d. T. 3 (British design.)	3	55	-	-	-	-	61	-	81	-	102	-	-	-	-	-
High speed steel M1	3	-	-	-	-	-	-	-	351	-	-	-	-	-	-	-
High speed steel M2	3	-	-	-	-	-	-	-	450	-	-	-	-	-	-	-
High speed steel M10	3	-	-	-	-	-	-	-	351	-	-	-	-	-	-	-
High speed steel T1	3	-	-	-	-	-	-	-	450	-	-	-	-	-	-	-
HNM crucible	3	-	-	-	-	-	-	161	176	-	227	-	-	-	-	-
HX 4249	3	-	-	-	-	-	-	-	-	85	-	-	-	-	-	-
Incoloys (see Incoloy)																
Invar H	3	-	-	-	-	-	-	-	-	-	363	-	-	-	-	-
Jessop no. 40	3	55	-	-	-	-	-	-	-	-	102	-	-	-	-	-
Jessop no. 46	3	55	-	-	-	-	-	-	-	-	104	-	-	-	-	-
Jessop G-18B	3	379	-	-	-	-	-	-	168	-	217	-	-	-	-	-
Jessop G-21	3	140	-	-	-	-	-	-	-	-	225	-	-	-	-	-
Jessop H-40	3	-	-	-	-	-	-	-	81	-	-	-	-	-	-	-
Jessop R-20	3	140	-	-	-	-	-	-	176	-	221	-	-	-	-	-
Kovar	3	-	-	-	-	-	-	-	363	-	-	-	-	-	-	-
Low carbon	3	-	-	-	-	-	-	319	-	-	-	-	-	-	-	-
Macloy G	3	-	-	-	-	-	-	-	393	-	-	-	-	-	-	-
Mark 12MX	3	-	-	-	-	-	-	323	-	-	-	-	-	-	-	-
Mark 1x18N9T	3	-	-	-	-	-	-	161	-	-	215	-	-	-	-	-
Mild steel	3	311	-	-	-	-	-	315	-	-	-	-	-	-	-	-
Multimet N-155	3	140	-	-	-	-	-	-	189	191	219	120	126-128, 253, 259	-	-	-
Multimet N-155, low carbon	3	-	-	-	-	-	-	-	296	-	-	-	-	-	-	-
Multimet NR-21 (AMS-55326)	3	140	-	-	-	-	-	-	-	-	219	-	-	-	-	-
Multimet NR-21, low carbon (AMS-53762)	3	-	-	-	-	-	-	-	-	-	219	-	-	-	-	-
N-A-X AC 9115	3	-	-	-	-	-	-	-	-	-	444	-	-	-	-	-
Ni-Span-C alloy 902	3	-	-	-	-	-	-	-	-	-	407	-	-	-	-	-
Gkh 16N 36VST	3	-	-	-	-	-	-	383	-	397	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Steels (cont.)																
P-193	3	379	-	-	-	-	-	-	-	-	405	-	-	-	-	-
PH 15-7 Mo	3	145	-	-	-	-	-	-	-	-	201	231	255, 259, 272	284	-	-
Porous	3	461	-	-	-	-	463	-	-	-	-	-	-	-	-	-
Rex 78	3	-	-	-	-	-	-	-	389	-	-	-	-	-	-	-
Roneusil	3	-	-	-	-	-	-	-	-	-	-	-	-	349	-	-
S-590	3	-	-	-	-	-	-	-	-	191, 208, 397	221	-	-	-	-	-
SAE steels (see SAE designations)																
SAS-8	3	140	-	-	-	-	-	-	-	-	227	-	-	-	-	-
Steel 15	3	-	-	-	-	-	-	-	-	331	-	-	-	-	-	-
Steel 19	3	-	-	-	-	-	-	71	-	-	-	-	-	-	-	-
Steel 35	3	-	-	-	-	-	-	-	-	331	-	-	-	-	-	-
Steel 45	3	-	-	-	-	-	-	-	-	331	-	-	-	-	-	-
Ter-''n	3	-	-	-	-	-	-	-	-	-	116	-	-	-	-	-
U-8	3	-	-	-	-	-	-	10	-	12	-	-	-	-	-	-
Unitemp 212	3	-	-	-	-	-	-	-	391	-	-	-	-	-	-	-
V-444D	3	-	-	-	-	-	-	-	-	-	223	-	-	-	-	-
Vacromin F	3	-	-	-	-	-	-	-	393	-	-	-	-	-	-	-
Vascojet 1000	3	-	-	-	-	-	-	-	81	-	-	-	132	136	-	-
Vickers F. D. P.	3	-	-	-	-	-	-	-	-	-	-	-	257	-	-	-
W	3	-	-	-	-	-	-	-	-	-	203	-	-	-	-	-
WF100D	3	140	-	-	-	-	-	-	-	-	225	-	-	-	-	-
Steel, clad	6-II	-	-	-	-	-	-	-	-	-	1267	-	-	-	-	-
Stellite no. 3	2-II	-	-	-	-	-	-	-	-	-	904	-	-	-	-	-
Stellite no. 4	2-II	-	-	-	-	-	-	-	-	-	904	-	-	-	-	-
Stellite no. 6	2-II	-	-	-	-	-	-	-	-	-	902	-	-	-	-	-
Stellite no. 6B	2-II	-	-	-	-	-	-	-	-	-	902	-	-	-	-	-
Stellite no. 6K	2-II	-	-	-	-	-	-	-	-	-	902	-	-	-	-	-
Stellite no. 12	2-II	-	-	-	-	-	-	-	-	-	902	-	-	-	-	-
Stellite no. 19	2-II	-	-	-	-	-	-	-	-	-	904	-	-	-	-	-
Stellite no. 21 (AMS-5385; NR-10)	2-II	879	-	-	-	-	-	884	886	-	894	-	-	-	-	-
Stellite no. 23 (AMS-5375; NDRC-61)	2-II	879	-	-	-	-	-	-	886	-	900	-	-	-	-	-
Stellite no. 25 (L-605).	2-II	879, 862	-	-	-	-	-	-	-	890	898	-	908-914	916	-	-
Stellite no. 25 (L-605) coated with iron (ic) oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	1381-1383	-	-	-
Stellite no. 27 (AMS-5378; NR-60)	2-II	1219	-	-	-	-	-	-	1223	-	1225	-	-	-	-	-

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Stellite no. 30 (AMS-5380, NR-12)	2-II	879	-	-	-	-	-	-	-	-	896	-	-	-	-	-
Stellite no. 31 (AMS-5382; NR-71)	2-II	879	-	-	-	-	-	-	886	-	896	-	-	-	-	-
Stellite no. 36 (L-251).	2-II	879	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stellite 98M2	2-II	-	-	-	-	-	-	-	-	-	906	-	-	-	-	-
Stellite HS-1049	2-II	-	-	-	-	-	-	884	888	-	900	-	-	-	-	-
Stellite Star J-metal.	2-II	-	-	-	-	-	-	-	-	-	906	-	-	-	-	-
Strontium (Sr)	1	924	924	-	-	-	926	-	-	-	928	-	-	-	-	-
Strontium aluminates																
SrO · Al_2O_3	4-II	1025	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SrO · 2 Al_2O_3	4-II	-	1025	-	-	-	-	-	-	-	1027	-	-	-	-	-
3 SrO · Al_2O_3	4-II	1025	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium aluminum silicate (SrO · Al_2O_3 · 2 SiO_2)	4-II	-	-	-	-	-	-	-	-	-	1334	-	-	-	-	-
Strontium barium cerium titanate [$(Ba_{1-x-y}Sr_xCe_y)O \cdot TiO_2$].	4-II	-	-	-	-	-	1466	-	-	-	-	-	-	-	-	-
Strontium barium cerium titanate stannate [$(Ba_{1-x}Sr_{x-y}Ce_y)O \cdot (Ti_{1-z}Sn_z)O_2$]	4-II	-	-	-	-	-	1363	-	-	-	-	-	-	-	-	-
Strontium borate glass.	4-II	-	-	-	-	-	-	-	-	-	1633	-	-	-	-	-
Strontium (hexa-)boride (SrB_6).	6-I	295	296	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium chloride ($SrCl_2$) . . .	5	-	-	-	-	-	-	333	-	-	-	-	-	-	-	-
Strontium copper silicate (SrO · CuO · 4 SiO_2)	4-II	-	-	-	-	-	-	-	-	-	1336	-	-	-	-	-
Strontium fluoride (SrF_2). . . .	5	397	397	-	-	-	-	399	-	-	-	-	-	401	-	-
Strontium lead silicate glass . .	4-II	-	-	-	-	-	1323	-	-	-	-	-	-	-	-	-
Strontium oxide (SrO)	4-I	387	387	-	-	387	389	391	393	-	395	-	-	-	-	397
Strontium oxide + Lithium (meta-)aluminate + Aluminum oxide	4-II	-	-	-	-	-	-	-	15?0	-	-	-	-	-	-	-
Strontium oxide + Lithium zirconium silicate + Aluminum oxide	4-II	-	-	-	-	-	-	-	1542	-	-	-	-	-	-	-
Strontium oxide + Lithium zirconium silicate + Zinc oxide	4-II	-	-	-	-	-	-	-	1544	-	-	-	-	-	-	-
Strontium oxide + Titanium (di-)oxide	4-I	-	828	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium oxide + Titanium (di-)oxide + Lithium zirconium silicate	4-II	-	-	-	-	-	-	-	1546	-	-	-	-	-	-	-
Strontium oxide + Zinc oxide + + Lithium zirconium silicate .	4-II	-	-	-	-	-	-	-	1548	-	-	-	-	-	-	-
Strontium silicates																
SrO · SiO_2	4-II	1332	1332	-	-	-	-	-	-	-	-	-	-	-	-	-
2 SrO · SiO_2	4-II	1332	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Strontium sulfide (SrS).	5	-	-	-	-	-	-	712	-	-	-	-	-	-	-	-
Strontium titanates																
$SrO \cdot TiO_2$	4-II	1456	1456	-	-	-	1458	1460	1462	-	1464	-	-	-	-	-
$SrO \cdot 2\,TiO_2$	4-II	-	-	-	-	-	-	-	-	-	1464	-	-	-	-	-
$2\,SrO \cdot TiO_2$	4-II	-	-	-	-	-	-	1460	-	-	-	-	-	-	-	-
Strontium titanate coating on AISI 310	6-II	-	-	-	-	-	-	-	-	-	-	-	1393	-	-	-
Strontium titanate + Cobalt cermet	6-II	-	-	-	-	-	-	-	792	-	-	-	-	-	-	-
Strontium uranate ($SrO \cdot UO_3$). .	4-II	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium zirconate ($SrO \cdot ZrO_2$).	4-II	1514	-	-	-	-	-	1516	-	-	1518	-	-	-	-	-
Styrene-butadiene copolymer . .	6-II	-	-	-	-	-	-	1054	-	-	-	-	-	-	-	-
Styrofoam Q-103	6-II	-	-	-	-	-	-	-	1090	-	-	-	-	-	-	-
Super Dylon	5-II	1030	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Supramica 557	5	-	-	-	-	-	987	-	-	-	-	-	-	-	-	-
Svea Iron	1	-	-	-	-	-	-	-	585	-	-	-	-	-	-	-
T																
TAC polyester	6-II	974	-	-	-	-	-	-	976	-	978	-	-	-	-	-
TAC polyester resin, reinforced	6-II	1180	-	-	-	-	-	1183	1185	1200	1187-1189	-	-	-	-	-
Talc	4-II	-	-	-	-	-	-	1289	-	-	-	-	-	-	-	-
Tan 9-4 tantalum	1	-	-	-	-	-	-	934	-	-	-	-	-	-	-	-
Tantalum (Ta)	1	930	930	-	-	930	932	934	936	938	940	942	944-950	952	-	954
Tantalum coated with aluminide.	6-II	-	-	-	-	-	-	-	-	-	-	-	1441-1443	1445	-	-
Tantalum coated with cobalt oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	1373-1375	-	-	-
Tantalum coated with pyrolytic graphite	6-II	-	-	-	-	-	-	-	-	-	-	-	1297-1299	-	-	-
Tantalum coated with silicide. .	6-II	-	-	-	-	-	-	-	-	-	-	-	1473-1475	1477	-	-
Tantalum coated with silicon carbide	6-II	-	-	-	-	-	-	-	-	-	-	-	1411-1413	-	-	-
Tantalum coated with tantalum aluminide	6-II	-	-	-	-	-	-	-	-	-	-	-	1461-1463	1465	-	-
Tantalum + Copper + ΣX_i . . .	2-II	1388	-	-	-	-	-	-	1390	-	1392	-	-	-	-	-
Tantalum + Niobium	2-I	-	-	-	-	-	463	-	465	-	-	-	-	-	-	-
Tantalum + Niobium + ΣX_i . . .	2-II	-	-	-	-	-	-	1394	1396	1398	1400	-	-	-	-	-
Tantalum + Titanium	2-I	467, 549	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum + Tungsten	2-I	-	-	-	-	-	-	469	471	473	475	477-479	-	-	-	-

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Tantalum + Tungsten + ΣX_i . . .	2-II	–	1402	–	–	–	1404	1406	1408	1410	1412	–	–	–	–	–
Tantalum + Zirconium + ΣX_i . .	2-II	1414	–	–	–	–	–	1416	1418	–	1420	–	–	–	–	–
Tantalum alloys (special designations)																
30 Nb – 7.5 V	2-II	–	–	–	–	–	–	1394	–	1398	–	–	–	–	–	–
8 W – 2 Hf	2-II	–	1402	–	–	–	1404	1406	–	1410	–	–	–	–	–	–
Tantalum aluminide ($TaAl_3$) . .	6-I	–	–	–	–	–	–	–	–	–	–	–	–	25	–	–
Tantalum aluminides coating on tantalum	6-II	–	–	–	–	–	–	–	–	–	–	–	1461-1463	1465	–	–
Tantalum antimonide (TaSb) . .	6-I	–	–	–	–	–	71	–	73	–	–	–	–	–	–	–
Tantalum arsenide (Ta_2As_3) . .	6-I	–	–	–	–	–	96	–	–	–	–	–	–	–	–	–
Tantalum beryllides																
$TaBe_{12}$	6-I	–	122	–	–	–	–	124	126	–	128	–	130-132	134	–	–
Ta_2Be_{17}	6-I	–	122	–	–	–	–	124	126	–	128	–	130-132	134	–	–
Tantalum beryllide + Beryllium oxide	5	–	–	–	–	–	–	–	–	–	–	–	868-870	872	–	–
Tantalum beryllide + Beryllium oxide + Tantalum (pent-)oxide.	5	–	–	–	–	–	–	–	–	–	–	–	874-876	878	–	–
Tantalum beryllide + Tantalum (pent-)oxide	5	–	–	–	–	–	–	–	–	–	–	–	880-882	884	–	–
Tantalum borides																
TaB	6-I	212	212	–	–	–	–	214	216	–	218	–	–	–	–	–
TaB_2	6-I	212	212	–	–	–	–	214	–	–	220	–	–	–	–	–
Ta_3B_2	6-I	–	212	–	–	–	–	–	–	–	–	–	–	–	–	–
Ta_3B_4	6-I	212	212	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum carbides																
TaC	5	141	141	–	–	–	143	145	147	149	151	–	154-158	–	–	160
Ta_2C	5	–	141	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum carbide coating on Inconel X	6-II	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum carbide + Iron cermet.	6-II	858	–	–	–	–	–	–	–	–	–	–	1417	1419	–	–
Tantalum carbide + Tungsten cermet	6-II	–	–	–	–	–	–	–	–	–	869	–	–	–	–	–
Tantalum-cobalt intermetallics ($TaCo_2$)	6-I	–	684	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum-chromium intermetallics ($TaCr_2$)	6-I	–	684	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum ferrides ($TaFe_2$) . . .	6-I	–	306	–	–	–	–	–	–	–	–	–	–	–	–	–
Tantalum germanides																
TaGe	6-I	–	–	–	–	–	325	–	–	–	–	–	–	–	–	–

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Tantalum germanides (cont.)																
$TaGe_2$	6-I	-	-	-	-	-	325	-	327	-	-	-	-	-	-	-
Ta_4Ge	6-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	321
Tantalum germanide silicides																
$TaGeSi_2$	6-I	-	-	-	-	-	-	-	325	-	-	-	-	-	-	
$TaGe_xSi_{1-x}$	6-I	-	-	-	-	-	-	-	329	-	-	-	-	-	-	-
Tantalum iron lead oxide ($4\ PbO \cdot Fe_2O_3 \cdot Ta_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1157	-	-	-	-	-
Tantalum nitrides																
TaN	5	557	557	-	-	-	559	561	563	-	565	-	567-580	-	-	-
Ta_2N	5	-	557	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum (pent-)oxide (Ta_2O_5) . .	4-I	-	-	-	-	-	-	399	-	-	401	-	403-405	407	-	-
Tantalum (pent-) oxide + + Tantalum beryllide	5	-	-	-	-	-	-	-	-	-	-	-	-	709	-	-
Tantalum phosphide (TaP) . . .	5	635	636	-	-	-	630	-	-	-	-	-	-	-	-	-
Tantalum selenides ($TaSe_2$). . .	6-I	-	-	-	-	-	367	-	369	-	-	-	-	-	-	-
Tantalum silicides																
Ta_5Si_3	6-I	-	467	-	-	-	-	-	-	-	-	-	-	-	-	
$TaSi_2$	6-I	-	467	-	-	-	527	469	529	-	471	-	473-475	477	-	-
Ta_2Si	6-I	-	467	-	-	-	-	-	-	-	-	-	-	-	-	-
Ta_5Si_2	6-I	-	467	-	-	-	-	-	-	-	-	-	-	-	-	-
$Ta_{4.5}Si$	6-I	-	467	-	-	-	-	-	-	-	-	-	-	-	-	-
(Penta-)tantalum (tri-)silicide + + (Di-)molybdenum boride . .	6-I	-	734	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum silicide germanides																
$TaGe_{1-x}Si_x$	6-I	-	-	.	-	-	325	-	-	-	-	-	-	-	-	-
TaGeSi	6-I	-	-	-	-	-	325	-	-	-	-	-	-	-	-	-
Tantalum tellurides																
TaTe	6-I	-	-	-	-	-	-	-	640	-	-	-	-	-	-	-
$TaTe_2$	6-I	-	-	-	-	-	630	-	640	-	-	-	-	-	-	-
Ta_xTe_3	6-I	-	-	-	-	-	630	-	-	-	-	-	-	-	-	-
Tantalum tungsten selenide ($W_{1-x}Ta_xSe_2$)	6-I	-	-	-	-	-	357	-	-	-	-	-	-	-	-	-
Teflon	6-II	1030	-	-	-	-	-	1035	1039	-	1045	-	-	-	-	-
Teflon, type TF-1	6-II	1030	-	-	-	-	-	-	-	-	1045	-	-	-	-	-
Teflon, barium titanate filled. .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, boron carbide filled . .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, calcium boride filled . .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, carbonyl iron grade HP filled	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, J-ferrite filled	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, J-mica filled	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-

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Teflon laminate	6-II	-	-	-	-	-	-	1214	1218	1220	-	-	-	-	-	-
Teflon, litharge filled	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, powdered iron-9 filled .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, quartz no. 7900 filled .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, reinforced	6-II	1097	-	-	-	-	-		1099	-	-	-	-	-	-	-
Teflon, titanium dioxide filled .	6-II	1032	-	-	-	-	-	-	-	-	1043	-	-	-	-	-
Teflon, zero-plast type 6 filled .	6-II	1032	·	-	-	-	-	-	-	-	1043	-	-	-	-	-
Television tube glass	4-II	-	-	-	-	-	-	-	-	-	-	-	1743	1745	1747	-
Tellurite	4-I	409	409	-	-	409	-	411	-	-	-	-	413	-	415	417
Tellurium (Te)	1	-	-	-	-	-	-	-	964	-	-	-	-	-	-	-
Tellurium + Chromium	2-I	-	-	-	-	-	481	483	-	-	-	-	-	-	-	-
Tellurium copper	2-I	-	-	-	-	-	-	-	-	-	152	-	-	-	-	-
Brass, tellurium-nickel	2-II	-	-	-	-	-	-	-	-	-	1002	-	-	-	-	-
Tellurium (di-)oxide (TeO_2) . .	4-I	409	409	-	-	409	-	411	-	-	-	-	413	-	415	417
Tellurium oxide - molybdenum oxide glass	4-II	-	-	-	-	-	-	-	-	-	1641	-	-	-	-	-
Tellurium oxide - tungsten oxide glass	4-II	-	-	-	-	-	-	-	-	-	1643	-	-	-	-	-
Tenite I 0072-MS	6-II	·	-	-	-	-	-	-	-	-	941	-	-	-	-	-
Tenite I 204-MS	6-II	-	-	-	-	-	-	-	-	-	946	-	-	-	-	-
Tenite II 205A-MS	6-II	-	-	-	-	-	-	-	-	-	946	-	-	-	-	-
Tenite G 204-H2	6-II	-	-	-	-	-	-	-	-	-	946	-	-	·	-	-
Tenite Q 264-H2	6-II	-	-	-	-	-	-	-	-	-	946	-	-	-		-
Tenite S 264-MS	6-II	-	-	-	-	-	-	-	-	-	946	-	-	-		-
Terbium (Tb)	1	956	956	956	956	956	958	960	-	-	962	-	-	-	-	-
Terbium borides																
TbB_4	6-II	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TbB_6	6-I	295	-	-	-	-	300	-	-	-	-	-	-	-	-	-
Terbium carbides																
TbC_2	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tb_2C_3	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terbium-cobalt intermetallics ($TbCo_5$)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terbium-gallium intermetallics ($TbGa_2$)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terbium hydride (TbH_3)	5	467	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Terbium oxide ($TbO_{1.814}$) . . .	4-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	419
Thorianite	4-I	421	421	-	-	422	425	428	430	-	432	-	435	-	-	437
Thorite	4-II	-	-	-	-	-	-	-	-	-	1338	-	-	-	-	-
Thorium (Th)	1	966	966	967	-	-	971	973	975	977	979	-	981	-	-	983
Thorium + Plutonium	2-I	411, 485	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium + Titanium	2-I	-	-	-	-	-	-	-	-	-	487	-	-	-	-	-
Thorium + Uranium	2-I	-	-	-	·	-	489	-	-	-	-	-	-	-	-	-

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Thorium + Uranium + ΣX_i . . .	2-II	-	1422	-	-	-	-		-	-	-	-	-	-	-	-
Thorium + Zirconium	2-I	-	-	-	-	-	-	-	-	-	491	-	-	-	-	-
Thorium + Zirconium + ΣX_i . .	2-II	-	1424	-	-	-	..	-	-	-	-	-	-	-	-	-
Thorium aluminate ($2\ ThO_2 \cdot 3\ Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1029	-	-	-	-	-
Thorium antimonides																
ThSb	6-I	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$ThSb_2$	6-I	81	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Th_3Sb_4	6-I	81	-	-	-	-	-	-	-	-	-	-	-	-	-	.
Thorium borides																
ThB_4	6-I	. 2	222	-	-	-	224	226	228	-	230	..	232	-	-	-
ThB_6	6-I	-	222	-	-	-	224	-	-	-	-	-	-	-	-	-
Thorium carbides																
ThC	5	-	162	-	-	-	-	-	168	-	-	-	172	-	-	-
ThC_2	5	162	162	-	-	-	164	166	168	-	170	-	172	-	-	-
Thorium carbide + Uranium (di-) carbide	5	-	-	-	-	-	-	-	-	-	301	-	-	-	-	-
Thorium chloride ($ThCl_4$) . . .	5	339	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium fluoride (ThF_4)	5	403	403	403	403	403	-	-	-	-	-	-	-	-	-	405
Thorium hydrides																
ThH_2	5	439	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ThH_3	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	441
Thorium-manganese intermetal-lics																
$ThMn_{12}$	6-I	683	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Th_6Mn_{23}	6-I	683	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium nitrides																
ThN	5	-	631	-	-	-	-	-	-	-	-	-	-	-	-	-
Th_3N_4	5	-	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium (di-)oxide (ThO_2). . .	4-I	421	421	-	-	422	425	428	430	-	432	-	435	-	-	437
Thorium (di-)oxide, molybdenum fibers reinforced	6-II	-	-	-	-	-	-	-	1265	-	-	-	-	-	-	-
Thorium (di-)oxide + Aluminum oxide	4-I	-	830	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium (di-)oxide + Aluminum oxide + Beryllium oxide. . . .	4-I	-	832	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium (di-)oxide + Graphite .	5	-	-	-	-	-	-	-	739	-	-	-	-	-	-	-
Thorium (di-)oxide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	-	..	-	-	-	794
Thorium (di-)oxide + Uranium (di-)oxide	4-I	-	-	-	-	-	834	-	-	-	-	-	-	-	-	-
Thorium (di-)oxide + Uranium (di-)oxide + Yttrium oxide . .	4-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	836
Thorium (di-)oxide + Zirconium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	838	-	-	-	-	-

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Thorium (ortho-)silicate ($ThO_2 \cdot SiO_2$)	4-II	-	-	-	-	-	-	-	-	-	1338	-	-	-	-	-
Thorium silicides																
ThSi	6-I	-	524	-	-	-	-	-	-	-	-	-	-	-	-	-
$ThSi_2$	6-I	-	523-524	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium sulfides																
ThS	5	714	714	-	-	-	-	-	-	-	718	-	-	-	-	-
ThS_2	5	714	714	-	-	-	-	716	-	-	-	-	-	-	-	-
Th_2S_3	5	-	714	-	-	-	-	-	-	-	-	-	-	-	-	-
Th_4S_7	5	714	714	-	-	-	-	-	-	-	-	-	-	-	-	-
Th_7S_{12}	5	-	714	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium uranium beryllide [$(Th,U)Be_{13}$]	6-I	-	-	-	-	-	-	-	-	-	136	-	-	-	-	-
Thorium uranium boride [$(Th,U)B_4$]	6-I	-	-	-	-	-	-	-	-	-	234	-	-	-	-	-
Thorium uranium carbides																
$(Th,U)C$	5	-	-	-	-	-	-	-	-	-	174	-	-	-	-	-
$(Th,U)C_2$	5	-	-	-	-	-	-	-	-	-	174	-	-	-	-	-
Thulia	4-I	-	-	-	-	-	-	-	-	-	439	-	-	-	-	-
Thulium (Tm)	1	985	985	985	985	985	987	989	-	-	-	-	-	-	-	991
Thulium (hexa-)boride (TmB_6) .	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thulium carbide (TmC_2)	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thulium oxide (Tm_2O_3)	4-I	-	-	-	-	-	-	-	-	-	439	-	-	-	-	-
Tin + Magnesium	2-I	-	-	-	-	-	493	-	-	-	-	-	-	-	-	-
Tin(ic) aluminate ($2SnO_2 \cdot 3Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1031	-	-	-	-	-
Tin(ic) oxide (SnO_2).	4-I	-	-	-	-	-	-	-	441	-	443	-	-	-	-	-
Tin(ic) oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	840	-	-	-	-	-	-	-
Tin(ic) oxide + Magnesium oxide + Zinc oxide	4-I	-	-	-	-	-	-	-	842	-	-	-	-	-	-	-
Tin(ic) oxide + Vanadium (pent-)oxide	4-I	-	-	-	-	-	-	-	-	-	844	-	-	-	-	-
Tin(ic) oxide + Zinc oxide . . .	4-I	-	-	-	-	-	-	-	846	-	-	-	-	-	-	-
Tin(ic) oxide + Zinc oxide + + Magnesium oxide.	4-I	-	-	-	-	-	-	-	848	-	-	-	-	-	-	-
Tin(ous) (ortho-)phosphate ($3 SnO \cdot P_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1179	-	-	-	-	-
Tin sulfide (SnS)	5	-	-	-	-	-	-	-	-	-	-	-	-	720	-	-
Tin telluride (SnTe)	6-I	-	-	-	-	-	632	-	-	-	-	-	-	-	-	-
Tin telluride + Silver antimony telluride	6-I	-	-	-	-	-	-	-	721	-	-	-	-	-	-	-
Tin-zirconium intermetallics																
$SnZr_3$	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Sn_3Zr_5	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Titanium (Ti)	1	993	993	–	–	993	996	999	1001	1003	1005	–	1007-1013	1015	–	1017
Titanium coated with aluminide .	6-II	–	–	–	–	–	–	–	–	–	–	–	1447-1449	1451	–	–
Titanium coated with aluminized-silicone paint	6-II	–	–	–	–	–	–	–	–	–	–	–	–	1497	–	–
Titanium coated with gold . . .	6-II	–	–	–	–	–	–	–	–	–	–	–	1303	1305	–	–
Titanium coated with silicides .	6-II	–	–	–	–	–	–	–	–	–	–	–	1479-1481	1483	–	–
Titanium A-55	1	–	–	–	–	–	996	–	–	–	1005	–	–	–	–	–
Titanium A-70	1	–	–	–	–	–	–	–	–	–	1005	–	–	–	–	–
Titanium Ti-75A	1	–	–	–	–	–	996	999	1001	–	1005	–	1007-1009	1015	–	–
Titanium Ti-75A (AMS 4901) coated with Dow-Corning XP-310	6-II	–	–	–	–	–	–	–	–	–	–	–	–	1497	–	–
Titanium RC-55	1	–	–	–	–	–	996	–	–	–	–	–	–	–	–	–
Titanium VT-1	1	–	–	–	–	–	–	–	–	1003	–	–	–	–	–	–
Titanium + ΣX_i	2-II	1502	–	–	–	–	1504	1506	–	–	1508	–	–	–	–	–
Titanium + Aluminum	2-I	–	–	–	–	–	495-501	–	503	505	–	–	–	–	–	–
Titanium + Aluminum + ΣX_i . .	2-II	–	–	–	–	–	1426-1432	1434	1436-1442	1444-1446	1448-1454	–	1456-1459	1461	–	–
Titanium + Chromium	2-I	–	–	–	–	–	–	–	–	–	507	–	–	–	–	–
Titanium + Chromium + ΣX_i . .	2-II	–	–	–	–	–	–	1464	1466	–	1468	–	–	–	–	–
Titanium + Copper	2-I	–	–	–	–	–	509	–	–	–	511	–	–	–	–	–
Titanium + Germanium	2-I	–	–	–	–	–	513	–	–	–	515	–	–	–	–	–
Titanium + Iron	2-I	–	–	–	–	–	–	–	–	–	517	–	–	–	–	–
Titanium + Iron + ΣX_i	2-II	1470	–	–	–	–	1472	–	1474	–	1476	–	–	–	–	–
Titanium + Manganese	2-I	519	–	–	–	–	521	523	525	527	529	–	531-535	537	–	–
Titanium + Manganese + ΣX_i . .	2-II	–	–	–	–	–	1478	–	–	–	1480	–	–	–	–	–
Titanium + Molybdenum	2-I	–	–	–	–	–	–	–	–	–	539	–	–	–	–	–
Titanium + Molybdenum + ΣX_i .	2-II	–	–	–	–	–	1482	–	–	–	–	–	–	–	–	–
Titanium + Nickel	2-I	–	–	–	–	–	–	–	–	–	541	–	–	–	–	–
Titanium + Niobium	2-I	–	–	–	–	–	543	–	–	–	545	–	–	–	–	–
Titanium + Silicon	2-I	–	–	–	–	–	–	–	–	–	547	–	–	–	–	–
Titanium + Tantalum	2-I	549	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Titanium + Tin	2-I	–	–	–	–	–	551	–	553	–	–	–	–	–	–	–
Titanium + Tin + ΣX_i	2-II	–	–	–	–	–	1484	–	1486	–	–	–	–	–	–	–
Titanium + Tungsten.	2-I	555	–	–	–	–	–	–	–	–	–	–	–	–	–	–
Titanium + Vanadium	2-I	557	–	–	–	–	–	–	–	–	559	–	–	–	–	–
Titanium + Vanadium + ΣX_i. . .	2-II	1483	–	–	–	–	–	1490	1492	–	1494	–	–	1496	–	–
Titanium + Zirconium	2-I	–	–	–	–	–	561	–	–	–	563	–	–	–	–	–
Titanium + Zirconium + ΣX_i . .	2-II	–	–	–	–	–	1498	–	1500	–	–	–	–	–	–	–

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Titanium alloys (special designations)																
2.5 Al - 16 V	2-II	-	-	-	-	-	-	1490	-	-	-	-	-	-	-	-
3 Al - 2.5 V	2-II	-	-	-	-	-	-	-	-	-	1454	-	-	-	-	-
4 Al - 3 Mo	2-II	-	-	-	-	-	-	-	-	-	1452	-	-	-	-	-
4 Al - 3 Mo - 1 V	2-II	-	-	-	-	-	-	1434	-	-	-	-	-	-	-	-
4 Al - 4 Mn	2-II	-	-	-	-	-	-	-	-	-	1450, 1481	-	-	-	-	-
6 Al - 4 V	2-II	-	-	-	-	-	1428	1434	1440	1444	1454	-	1456-1459	-	-	-
7 Al - 4 Mo	2-II	-	-	-	-	-	-	-	-	-	1452	-	-	-	-	-
7 Al - 2 Nb - 1 Ta	2-II	-	-	-	-	-	-	-	-	-	1448	-	-	-	-	-
13 V - 11 Cr - 3 Al	2-II	-	-	-	-	-	-	1490	-	-	-	-	-	-	-	-
48 - OT - 3	2-I	-	-	-	-	-	-	-	-	505	-	-	-	-	-	-
A - 110 AT	2-II	-	-	-	-	-	1432	-	1438	-	1448	-	1456-1459	1461	-	-
B120VCA (crucible heat no. R6759 sheet no. 9MB3) . . .	2-II	-	-	-	-	-	-	-	1492	-	1494	-	-	1496	-	-
BT-5	2-I	-	-	-	-	-	-	-	-	505	-	-	-	-	-	-
C-110M	2-I	-	-	-	-	-	521	523	525	527	529	-	533-535	537	-	-
C-120AV	2-II	-	-	-	-	-	-	-	-	-	1454	-	-	-	-	-
C-130AM	2-II	-	-	-	-	-	1426, 1478	-	1442	-	-	-	-	-	-	-
Cr - Mo	2-II	-	-	-	-	-	-	-	1466	-	-	-	-	-	-	-
Heat no. 32167 and sheet no. 1777A-1	2-II	-	-	-	-	-	-	-	-	-	1454	-	-	-	-	-
Heat no. R6736 sheet no. B-32	2-II	-	-	-	-	-	-	-	1436	-	1452	-	-	-	-	-
Heat no. 23345 sheet no. 1149-3	2-II	-	-	-	-	-	-	-	1492	-	1494	-	-	-	-	-
Hylite 20	2-II	-	-	-	-	-	1432	-	1438	-	-	-	-	-	-	-
Hylite 30	2-II	-	-	-	-	-	1426, 1478	-	1442	-	-	-	-	-	-	-
Hylite 40	2-II	-	-	-	-	-	1426, 1478	-	1442	-	-	-	-	-	-	-
Hylite 50	2-II	-	-	-	-	-	1432, 1482	-	1436	-	-	-	-	-	-	-
Hylite 55	2-II	-	-	-	-	-	1484	-	1486	-	-	-	-	-	-	-
Hylite 60	2-II	-	-	-	-	-	1484	-	1486	-	-	-	-	-	-	-
MST-3Mn	2-II	-	-	-	-	-	-	-	-	-	1481	-	-	-	-	-
RC-130A	2-I	-	-	-	-	-	521	523	525	527	529	-	533-535	537	-	-
RC-130B	2-II	-	-	-	-	-	1426, 1478	-	-	-	1450	-	-	-	-	-
RMI-8Mn	2-II	-	-	-	-	-	-	-	-	-	1481	-	-	-	-	-
RMI-30	2-I	-	-	-	-	-	-	-	-	-	517	-	-	-	-	-
RMI-40	2-I	-	-	-	-	-	-	-	-	-	517	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Titanium alloys (special designations) (cont.)																
RMI-55	2-I	-	-	-	-	-	-	-	-	-	517	-	-	-	-	-
RMI-70	2-I	-	-	-	-	-	-	-	-	-	517	-	-	-	-	-
RS-120	2-I	-	-	-	-	-	-	-	-	-	-	-	531	-	-	-
Ti-140A	2-II	-	-	-	-	-	1472	-	1474	-	-	-	-	-	-	-
Ti-150A	2-II	-	-	-	-	-	-	-	1466	-	-	-	-	-	-	-
Ti-155A	2-II	-	-	-	-	-	1432	-	1442	-	-	-	-	-	-	-
Titanium alloy 6 Al - 4 V coated with Rokide C	6-II	-	-	-	-	-	-	-	-	-	-	-	1345-1347	-	-	-
Titanium aluminide (TiAl) . . .	6-I	27	27	-	-	-	-	-	-	-	-	-	29-31	33	-	-
Titanium aluminide + Aluminum oxide	5	-	-	-	-	-	-	-	-	-	-	-	862-864	866	-	-
Titanium beryllides																
TiBe	6-I	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiBe_2$	6-I	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiBe_{12}$	6-I	-	-	-	-	-	-	140	142	-	-	-	-	-	-	-
Titanium borides																
TiB	6-I	233	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2	6-I	236	236	-	-	-	238	240	242	-	244	-	246-248	-	-	-
Ti_2B	6-I	-	236	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-)boride + + Aluminum boride	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-)boride + + Boracic acid	5	-	-	-	-	-	-	-	-	-	-	-	886-888	890	-	-
Titanium (di-)boride + + Chromium (di-)boride . . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-)boride + + (Penta-)niobium (tri-)-silicide	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-)boride + + Tantalum (di-)silicide . . .	6-I	-	724	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-)boride + + Titanium (di-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	892-894	896	-	-
Titanium (di-)boride + + Titanium (di-)oxide + + Boracic acid	5	-	-	-	-	-	-	-	-	-	-	-	898-900	902	-	-
Titanium (di-)boride + + Titanium nitride	5	-	-	-	-	-	-	-	-	-	801	-	-	-	-	-
Titanium (di-)boride + + Vanadium (di-)boride . . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium carbide (TiC)	5	176	176	-	-	-	178	180	182	185	187	-	189-193	-	-	-

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Titanium carbide + Cobalt cermet	6-II	862	-	-	-	-	-	-	911	-	864	-	-	-	-	-
Titanium carbide + Molybdenum + + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	866	-	-	-	-	-
Titanium carbide + Nickel cermet	6-II	868	-	-	-	-	-	871	873	-	875-877	-	-	-	-	-
Titanium carbide + Niobium carbide + Nickel cermet	6-II	-	-	-	-	-	-	-	911	-	-	-	-	-	-	-
Titanium carbide + Tungsten cermet	6-II	-	-	-	-	-	-	-	-	-	879	-	-	-	-	-
Titanium-chromium intermetallics ($TiCr_2$)	6-I	-	-	-	-	-	-	-	-	-	-	-	656-658	660	-	-
Titanium-chromium intermetallics + Chromium (sesqui-)-oxide	5	-	-	-	-	-	-	-	-	-	926	-	928-930	932	-	-
Titanium-chromium intermetallics + Chromium (sesqui-)-oxide + Titanium (di-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	934-936	938	-	-
Titanium-chromium intermetallics + Titanium (di-)oxide	5	-	-	-	-	-	-	-	-	-	-	-	940-942	944	-	-
Titanium ferrides																
TiFe	6-I	-	306	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiFe_2$	6-I	-	306	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium-gold intermetallics																
TiAu	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiAu_2$	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Ti_3Au	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium hydride (TiH)	5	-	-	-	-	-	443	445	-	-	-	-	-	-	-	-
Titanium iodide (TiI_2)	5	-	-	-	-	-	-	-	-	-	475	-	-	-	-	-
Titanium nitride (TiN)	5	571	571	-	-	-	573	575	577	579	581	-	584	-	-	-
Titanium nitride + Chromium + + Titanium cermet	6-II	-	-	-	-	-	-	-	-	-	909	-	-	-	-	-
Titanium nitride + Titanium (di-)boride	5	-	-	-	-	-	-	-	-	-	842	-	-	-	-	-
Titanium oxides																
TiO	4-I	-	-	-	-	446	-	452	-	-	462	-	-	-	-	479
TiO_2	4-I	445	445	-	-	446	450	454	460	-	462	465	467-471	473-475	477	479
Ti_2O_3	4-I	-	-	-	-	-	-	456	-	-	-	-	-	-	-	-
Ti_3O_5	4-I	-	-	-	-	-	-	458	-	-	-	-	-	-	-	479
Titanium (mon-)oxide + + Chromium-titanium alloys cermet	6-II	-	-	-	-	-	-	-	-	-	796	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Titanium (di-) oxide and aluminum oxide coating on molybdenum	6-II	-	-	-	-	-	-	-	-	-	-	-	1395	-	-	-
Titanium (di-) oxide + Antimony (tri-) oxide	4-I	-	-	-	-	-	-	-	-	-	850	-	-	-	-	-
Titanium (di-) oxide + Beryllium oxide + Calcium titanium silicate + Magnesium oxide	4-II	-	-	-	-	-	-	-	-	-	1550	-	-	-	-	-
Titanium (di-) oxide + Lithium carbonate	4-II	-	-	-	-	-	-	-	-	-	1552	-	-	-	-	-
Titanium (di-) oxide + Manganese (di-) oxide	4-I	-	-	-	-	-	-	-	-	-	852	-	-	-	-	-
Titanium (di-) oxide + Niobium (pent-) oxide	4-I	-	854	-	-	-	-	-	-	-	856	-	-	-	-	-
Titanium (di-) oxide + Silicon (di-) oxide	4-I	-	-	-	-	-	858	-	-	-	860	-	-	-	-	-
Titanium (di-) oxide + Strontium oxide	4-I	-	862	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (di-) oxide + Tin(ic) oxide	4-I	-	-	-	-	-	-	-	-	-	864	-	-	-	-	-
Titanium (di-) oxide + Titanium (di-) boride	5	-	-	-	-	-	-	-	-	-	-	-	791-793	795	-	-
Titanium (di-) oxide + Tungsten (tri-) oxide	4-I	-	-	-	-	-	-	-	-	-	866	-	-	-	-	-
Titanium (di-) oxide + Vanadium (pent-) oxide	4-I	-	-	-	-	-	-	-	-	-	868-870	-	-	-	-	-
Titanium (di-) oxide + Zirconium (di-) oxide	4-I	-	-	-	-	-	-	-	-	-	872	-	-	-	-	-
Titanium phosphates																
$TiO_2 \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1181	-	-	-	-	-
$5\ TiO_2 \cdot 2\ P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1181	-	-	-	-	-
Titanium phosphide (TiP)	5	635	636	-	-	-	639	-	-	-	-	-	-	-	-	-
Titanium silicides																
TiSi	6-I	-	477	-	-	-	-	481	-	-	483	-	-	-	-	-
$TiSi_2$	6-I	479	478	-	-	-	-	481	-	-	483	-	485-487	489	-	-
Ti_5Si_3	6-I	-	479	-	-	-	-	481	-	-	483	-	-	489	-	-
Titanium (di-) silicide + + (Penta-) titanium (tri-) silicide	6-I	-	-	-	-	-	-	-	-	-	-	-	693-695	697	-	-
(Penta-) titanium (tri-) silicide + + Titanium (di-) silicide	6-I	-	-	-	-	-	-	-	-	-	-	-	699-701	703	-	-
Titanium tungsten (di-) carbide + + Cobalt cermet	6-II	-	-	-	-	-	-	-	-	-	881	-	-	-	-	-
Titanium tungsten (di-) carbide + + Tantalum cermet	6-II	-	-	-	-	-	-	-	-	-	853	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Titanox TG	4-I	-	-	-	-	-	-	-	-	-	462	-	-	-	-	-
Transite	6-II	-	-	-	-	-	-	1216	-	-	-	-	-	-	-	-
Tremolite	4-II	-	-	-	-	-	-	1239	-	-	-	-	-	-	-	-
Trolitul Luv-M150	6-II	-	-	-	-	-	-	970	972	1082	-	-	-	-	-	-
Tungsten (W)	1	1019	1019	-	-	-	1021	1023	1025	1027	1029	-	1031-1038	1040-1042	-	1044
Tungsten, lamp grade	1	-	-	-	-	-	-	-	-	-	-	-	1038	-	-	-
Tungsten coated with hafnium (di-) oxide	6-II	-	-	-	-	-	-	-	-	-	-	-	1377-1379	-	-	-
Tungsten coated with silicide . .	6-II	-	-	-	-	-	-	-	-	-	-	-	1485-1487	1489	-	-
Tungsten coating on Inconel X .	6-II	-	-	-	-	-	-	-	-	-	-	-	1329	1331	-	-
Tungsten coating on iron	6-II	-	-	-	-	-	-	-	-	-	-	1325	1327	-	-	-
Tungsten + ΣX_i	2-II	1516	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten + Cobalt	2-I	-	-	-	-	-	-	-	-	-	565	-	-	-	-	-
Tungsten + Copper	2-I	-	-	-	-	-	-	-	-	-	567	-	-	-	-	-
Tungsten + Molybdenum	2-I	-	-	-	-	-	-	-	-	-	-	-	569-573	-	-	-
Tungsten + Nickel + ΣX_i	2-II	1510	-	-	-	-	-	-	1512	-	1514	-	-	-	-	-
Tungsten + Niobium	2-I	-	575	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten + Rhenium	2-I	-	-	-	-	-	577	-	-	-	-	-	-	-	-	-
Tungsten alloys (special design.)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B50YA12B	2-II	-	-	-	-	-	-	-	-	-	1514	-	-	-	-	-
Heavy alloy	2-II	-	-	-	-	-	-	-	-	-	1514	-	-	-	-	-
Mallory 1000	2-II	-	-	-	-	-	-	-	-	-	1514	-	-	-	-	-
Tungsten aluminide (WAl) . . .	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten arsenide (W_3As_7) . . .	6-I	-	-	-	-	-	96	-	-	-	-	-	-	-	-	-
Tungsten borides																
WB	6-I	-	250	-	-	-	252	254	258	260	262	-	264	-	-	-
WB_2	6-I	-	250	-	-	-	-	-	-	-	-	-	-	-	-	-
W_2B	6-I	-	250	-	-	-	-	256	-	-	-	-	-	-	-	-
W_2B_5	6-I	-	250	-	-	-	-	256	-	-	-	-	-	-	-	-
Tungsten carbides																
WC	5	195	195	-	-	-	197	199	201	-	203	-	205-209	-	-	215
W_2C	5	-	195	-	-	-	-	-	-	-	203	-	211-213	-	-	-
Tungsten carbide coating on iron	6-II	-	-	-	-	-	-	-	-	-	-	1421	1423	-	-	-
Tungsten carbide + Chromium-cobalt alloys cermet	6-II	-	-	-	-	-	-	-	-	-	895	-	-	-	-	-
Tungsten carbide + Cobalt cermet	6-II	-	-	-	-	-	-	-	839	-	897-905	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Tungsten carbide + Nickel cermet	6-II	-	-	-	-	-	-	-	-	-	907	-	-	-	-	-
Tungsten-cobalt alloy coating on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1341	1342	-	-
Tungsten-cobalt intermetallics (WCo_2)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten iron lead oxide (3 $PbO \cdot Fe_2O_3 \cdot WO_3$)	4-II	-	-	-	-	-	-	-	-	-	1159	-	-	-	-	-
Tungsten nitride (WN)	5	-	521	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten oxides																
WO_2	4-I	-	-	-	-	-	-	-	-	-	485	-	-	-	-	-
WO_3	4-I	-	-	-	-	-	-	481	483	-	485	-	-	-	-	-
$W_{18}O_{49}$	4-I	-	-	-	-	-	-	-	-	-	485	-	-	-	-	-
$W_{20}O_{58}$	4-I	-	-	-	-	-	-	-	-	-	485	-	-	-	-	-
Tungsten (tri-)oxide + Zinc oxide	4-I	-	-	-	-	-	-	-	874	-	-	-	-	-	-	-
Tungsten phosphide (WP). . . .	5	635	636	-	-	-	639	-	-	-	-	-	-	-	-	-
Tungsten selenide (WSe_2). . . .	6-I	-	-	-	-	-	359	-	361	-	-	-	-	-	-	-
Tungsten selenide tellurides ($WSe_{2-x}Te_x$)	6-I	-	-	-	-	-	634	-	-	-	-	-	-	-	-	-
Tungsten silicides																
WSi	6-I	-	491	-	-	-	-	-	-	-	-	-	-	-	-	-
WSi_2	6-I	-	491	-	-	-	-	493	495	-	497	-	-	499	-	-
W_5Si_2	6-I	-	491	-	-	-	-	-	-	-	-	-	-	-	-	-
W_3Si_3	6-I	-	491	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten tellurides (WTe_2). . .	6-I	-	-	-	-	-	638	-	640	-	-	-	-	-	-	-
Tungsten-zirconium intermetallics (W_2Zr)	6-I	-	684	-	-	-	-	-	-	-	-	-	-	-	-	-
U																
Udimet 500	2-II	-	-	-	-	-	-	-	1134	-	-	-	1201, 1233	1213, 1235	-	-
Udimet 600	2-II	-	-	-	-	-	-	-	1134	-	-	-	-	-	-	-
Uranium (U)	1	1046	1046	-	-	-	1049	1051	1053	1056	1058	-	1061-1063	-	-	-
Uranium + ΣX_i	2-II	-	-	1544	1544	1544	-	-	-	-	-	-	-	-	-	1546
Uranium + Chromium	2-I	579	579	-	-	-	581	583	585	-	587	-	-	-	-	-
Uranium + Iron	2-I	589	-	-	-	-	-	-	-	-	591	-	-	-	-	-
Uranium + Magnesium	2-I	-	-	-	-	-	-	-	593	-	595	-	-	-	-	-
Uranium + Molybdenum	2-I	599	597	-	-	-	601	603	605	-	607-613	-	-	-	-	-
Uranium + Molybdenum + ΣX_i. .	2-II	-	1518	-	-	-	-	-	1520	-	1522-1526	-	-	-	-	-
Uranium + Niobium	2-I	-	617	-	-	-	-	-	619	-	-	-	621-623	-	-	-
Uranium + Plutonium + ΣX_i . .	2-II	-	1528	-	-	-	-	-	-	-	1530	-	-	-	-	-

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Uranium + Thorium + ΣX_i . . .	2-II	-	1532	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium + Zirconium	2-I	625	-	-	-	-	627	-	629	-	631-641	-	-	-	-	-
Uranium + Zirconium + ΣX_i . .	2-II	-	1534	-	-	-	1536	-	1538	-	-	-	1540-1542	-	-	-
Uranium alloys (special design.)																
Fissium alloy	2-II	-	1518	-	-	-	-	-	1520	-	-	-	-	-	-	-
U-3% FS	2-II	-	-	-	-	-	-	-	1520	-	-	-	-	-	-	-
U-5% FS	2-II	-	-	-	-	-	-	-	1520	-	-	-	-	-	-	-
U-5% FS - 2.25 Zr	2-II	-	-	-	-	-	-	-	1538	-	-	-	-	-	-	-
U-8% FS	2-II	-	-	-	-	-	-	-	1520	-	-	-	-	-	-	-
U-10% FS	2-II	-	-	-	-	-	-	-	1520	-	-	-	-	-	-	-
Uranium aluminides																
UAl_2	6-I	35	35	-	-	-	-	-	-	-	37	-	-	-	-	-
UAl_3	6-I	35	35	-	-	-	-	-	-	-	-	-	-	-	-	-
UAl_4	6-I	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium beryllide (UBe_{13}) . .	6-I	144	-	-	-	-	-	-	146	-	-	-	-	-	-	-
Uranium-bismuth intermetallics																
UBi	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
UBi_2	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
U_3Bi_4	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
U_4Bi_5	6-I	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium borides																
UB_2	6-I	-	266	-	-	-	-	-	-	-	268	-	-	-	-	-
UB_4	6-I	265	266	-	-	-	-	-	-	-	-	-	-	-	-	-
UB_{12}	6-I	-	266	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium bromide (UBr_3)	5	11	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium carbides																
UC	5	217	217	-	-	-	219	223	231	235	237	-	243, 245	-	-	-
UC_2	5	-	217	-	-	-	221	225-227	233	-	239	-	243-245	-	-	-
U_2C_3	5	217	217	-	-	-	-	229	-	-	241	-	-	-	-	-
Uranium (mono-)carbide + + Molybdenum cermet	6-II	-	-	-	-	-	-	-	-	-	691	-	-	-	-	-
Uranium (mono-)carbide + + Uranium cermet	6-II	-	-	-	-	-	-	-	-	-	693	-	-	-	-	-
Uranium (di-)carbide + Graphite	5	-	-	-	-	-	-	-	743	-	-	-	-	-	-	-
Uranium chlorides																
UCl_3	5	335	-	-	-	-	-	337	-	-	-	-	-	-	-	-
UCl_4	5	335	-	-	-	-	-	337	-	-	-	-	-	-	-	-
Uranium-cobalt intermetallics																
UCo	6-I	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U_6Co	6-I	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Uranium ferrides																
UFe_2	6-I	306	306	-	-	-	-	-	-	-	-	-	-	-	-	-
U_6Fe	6-I	306	306	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium fluorides																
UF_3	5	-	497	-	-	-	-	-	-	-	-	-	-	-	-	-
UF_4	5	407	407	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium hydride (UH_3).	5	447	-	-	-	-	-	449	-	-	-	-	-	-	-	-
Uranium iodides																
UI_3	5	-	477	-	-	-	-	-	-	-	-	-	-	-	-	-
UI_4	5	-	477	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-lead intermetallics																
UPb	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
UPb_3	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-manganese intermetallics																
UMn_2	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
U_6Mn	6-I	676	676	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium-nickel intermetallics (U_6Ni)	6-I	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium nitrides																
UN	5	596	596	-	-	-	-	-	565	596	582	-	-	-	-	-
$UN_{1.[illegible]}$	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	584
UN_2	5	563	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U_2N_3	5	568	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium oxides																
UO_2	4-I	455	459	-	-	-	493	495	503-511	515	517	-	520	-	-	522
$UO_{2.[illegible]}$	4-I	-	-	-	-	-	-	-	505	-	517	-	-	-	-	-
UO_3	4-I	455	459	-	-	-	-	497	-	-	-	-	-	-	-	-
U_2O_5	4-I	-	-	-	-	-	493	-	-	-	-	-	-	-	-	-
U_3O_7	4-I	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-
U_3O_8	4-I	455	459	-	-	-	-	499	525	-	-	-	-	-	-	-
U_4O_9	4-I	-	-	-	-	-	-	501	-	-	-	-	-	-	-	-
Uranium (di-)oxide powder. . .	4-I	-	-	-	-	-	-	-	511	-	-	-	520	-	-	-
Uranium (di-)oxide + Beryllium oxide	4-I	-	-	-	-	-	-	-	876	-	878	-	-	-	-	-
Uranium (di-)oxide + Chromium cermet	6-II	-	-	-	-	-	798	-	900	-	902	-	-	-	-	-
Uranium (di-)oxide + + Dysprosium oxide	4-I	-	-	-	-	-	-	-	-	-	590	-	-	-	-	-
Uranium (di-)oxide + Graphite .	5	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-
Uranium (di-)oxide + + Magnesium oxide.	4-I	-	-	-	-	-	-	-	-	-	882	-	-	-	-	-
Uranium (di-)oxide + + Molybdenum cermet	6-II	-	-	-	-	-	904	-	906	-	907	-	-	-	-	-

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Uranium (di-)oxide + Niobium cermet	6-II	-	-	-	-	-	810	-	812	-	-	-	-	-	-	-
Uranium (di-)oxide + Stainless steel cermet	6-II	-	-	-	-	-	814	-	816	-	818	-	-	-	-	-
Uranium (di-)oxide + Thorium (di-)oxide	4-I	-	-	-	-	-	884	-	-	-	-	-	-	-	-	-
Uranium (di-)oxide + Thorium (di-)oxide + Yttrium oxide . .	4-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	886
Uranium (di-)oxide + Yttrium oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	888
Uranium (di-)oxide + + Zirconium cermet	6-II	820	-	-	-	-	-	-	822	-	824	-	-	-	-	-
Uranium (di-)oxide + + Zirconium (di-)oxide	4-I	-	890	-	-	-	-	-	-	-	892	-	-	-	-	-
Uranium phosphate ($UO_2 \cdot P_2O_5$) .	4-II	-	-	-	-	-	-	-	-	-	1183	-	-	-	-	-
Uranium plutonium carbide ($U_{1-x}Pu_xC$)	5	-	-	-	-	-	247	-	-	-	-	-	-	-	-	-
Uranium silicides																
USi	6-I	501	501	-	-	-	-	-	-	-	509	-	-	-	-	-
USi_2	6-I	501	501	-	-	-	-	505	-	-	509	-	-	-	-	-
USi_3	6-I	501	501	-	-	-	503	505	-	-	509	-	-	-	-	-
U_3Si	6-I	501	501	-	-	-	503	505	507	-	509	-	-	-	-	-
U_3Si_2	6-I	501	501	-	-	-	-	-	-	-	509	-	-	-	-	-
Uranium stannide (USn_3)	6-I	541	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium sulfides																
US	5	722	722	-	-	-	-	-	-	-	724	-	-	-	-	-
US_2	5	722	722	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium thorium oxide ($Th_{1-x}U_xO_2$)	4-II	-	-	-	-	-	-	-	1161	-	-	-	-	-	-	-
Uranium-titanium intermetallics (U_2Ti)	6-I	-	676	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium zirconium carbide ($U_{1-x}Zr_xC$)	5	-	-	-	-	-	-	-	-	-	-	-	249	-	-	-
Uranium zirconium hydride ($U_{1-x}Zr_xH$)	5	-	-	-	-	-	-	-	-	-	451	-	-	-	-	-
Uranyl oxide	4-I	488	489	-	-	-	-	497	-	-	-	-	-	-	-	-
Urea formaldehyde, alpha cellulose filled	6-II	-	-	-	-	-	-	-	-	-	1002	-	-	-	-	-
V																
Vanadate glass	4-II	-	-	-	-	-	1645	-	-	-	1647	-	-	-	-	-
Vanadium (V)	1	1065	1065	-	-	1065	1067	1069	1071	-	1073	-	1075	1077	-	1079
Vanadium + ΣX_i	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Aluminum	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Antimony	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Chromium	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-

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Vanadium + Copper	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Iron	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Manganese	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Nickel	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Palladium	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Silicon	2-I	-	-	-	-	-	-	-	-	-	645	-	-	-	-	-
Vanadium + Silicon + ΣX_i . . .	2-II	-	-	-	-	-	-	-	1546	-	-	-	-	-	-	-
Vanadium + Tin	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium + Titanium	2-I	647	-	-	-	-	643	-	649	-	651	-	-	-	-	-
Vanadium + Titanium + ΣX_i . .	2-II	-	-	-	-	-	-	-	1550	-	-	-	-	-	-	-
Vanadium + Zirconium	2-I	-	-	-	-	-	643	-	-	-	-	-	-	-	-	-
Vanadium aluminide (V_3Al) . .	6-I	-	43	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium beryllide (VBe_{12}) . .	6-I	-	158	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium borides																
VB	6-I	-	270	-	-	-	-	-	-	-	-	-	-	-	-	-
VB_2	6-I	270	270	-	-	-	-	-	-	-	272	-	-	-	-	-
V_3B_2	3-I	-	270	-	-	-	-	-	-	-	-	-	-	-	-	-
V_3B_4	6-I	-	270	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (di-)boride + + Chromium (di-)boride . . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium (di-)boride + + Titanium (di-)boride	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium carbides																
VC	5	251	251	-	-	-	253	255	257	-	259	-	261	-	-	-
V_2C	5	-	251	-	-	-	-	-	-	-	259	-	-	-	-	-
Vanadium germanium lead oxide ($5\ PbO \cdot GeO_2 \cdot V_2O_5$)	4-II	-	-	-	-	-	-	-	-	-	1163	-	-	-	-	-
Vanadium hydride (VH)	5	-	-	-	-	-	-	453	-	-	-	-	-	-	-	-
Vanadium-manganese intermetallics (VMn_2)	6-I	-	685	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium nitride (VN)	5	536	596	-	-	-	-	598	-	-	600	-	-	-	-	-
Vanadium oxides																
VO	4-I	-	-	-	-	524	-	528	-	-	-	-	-	-	-	536
V_2O_3	4-I	-	-	-	-	-	52[illegible]	530	-	-	-	-	-	-	-	-
V_2O_4	4-I	-	-	-	-	-	-	532	-	-	-	-	-	-	-	-
V_2O_5	4-I	524	524	-	-	-	526	534	-	-	-	-	-	-	-	-
Vanadium (pent-)oxide + + Titanium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	394	-	-	-	-	-
Vanadium phosphide (VP) . . .	5	635	636	-	-	-	639	-	-	-	-	-	-	-	-	-
Vanadium silicides																
VSi	6-I	-	511	-	-	-	-	-	-	-	-	-	-	-	-	-
VSi_2	6-I	-	-	-	-	-	-	513	-	-	515	-	-	-	-	-
V_3Si	6-I	-	511	-	-	-	-	513	-	-	515	-	-	-	-	-
V_5Si_3	6-I	-	511	-	-	-	-	513	-	-	515	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Vanadium silicon lead oxide (5 PbO · SiO_2 · V_2O_5)	4-II	-	-	-	-	-	-	-	-	-	1165	-	-	-	-	-
Vanadium-zirconium intermetallics (V_2Zr)	6-I	-	685	-	-	-	-	-	-	-	-	-	-	-	-	-
Vermiculite, expanded	4-I	-	-	-	-	-	-	-	814	-	-	-	-	-	-	-
Vinylite VMCH	6-II	-	-	-	-	-	-	-	-	-	950	-	-	-	-	-
Vinylite VYDR	6-II	-	-	-	-	-	-	-	-	-	930	-	-	-	-	-
Vitreous bonded aluminum titanate	5	-	-	-	-	-	949-953	-	-	-	955-977	-	-	-	-	-
Vulcollan	6-II	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vycor no. 790	4-II	-	1651	-	-	-	1653	-	-	-	1663	-	-	-	-	-
Vycor 7900	4-II	-	-	-	-	-	-	1655	-	1661	-	-	1665	1669	1671-1673	-
Vycor glasses	4-II	1651	1651	-	-	-	1653	1655	1657, 1699	1659-1661	1663	-	1665-1667	1669	1671-1673	-
W																
Willemite	4-II	-	-	-	-	-	-	1340	-	-	-	-	-	-	-	-
Wollastonite	4-II	-	-	-	-	-	-	1229	-	-	-	-	-	-	-	-
Wustite	4-I	-	-	-	-	-	-	-	-	-	222	-	-	-	-	-
Y																
Ytterbia	4-I	538	-	-	-	-	-	540	-	-	542	-	-	-	544	-
Ytterbium (Yb)	1	1081	1081	1081	1081	1081	1083	1085	-	-	-	-	-	-	-	-
Ytterbium + Calcium	2-I	-	-	-	-	-	-	-	-	-	653	-	-	-	-	-
Ytterbium borides																
YbB_4	6-I	295	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YbB_6	6-I	295	-	-	-	-	300	-	-	-	-	-	-	-	-	-
Ytterbium carbide (YbC_2)	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ytterbium oxide (Yb_2O_3)	4-I	538	-	-	-	-	-	540	-	-	542	-	-	-	544	-
Ytterbium selenide (YbSe)	6-I	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ytterbium sulfide (Yb_2S_3)	5	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttria	4-I	546	-	-	-	-	-	548	550	-	552	-	555-559	-	561	-
Yttrium (Y)	1	1087	1087	1087	1087	1087	1089	1091	1093	-	-	-	1095	-	-	1097
Yttrium + ΣX_i	2-II	-	-	-	-	-	-	1554	-	1556	-	-	-	-	-	-
Yttrium + Tantalum	2-I	-	-	-	-	-	-	655	-	-	-	-	-	-	-	-
Yttrium + Terbium	2-I	-	-	-	-	-	657	-	-	-	-	-	-	-	-	-
Yttrium + Terbium + ΣX_i	2-II	1552	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium borides																
YB_2	6-I	295	297	-	-	-	-	-	-	-	-	-	-	-	-	-
YB_4	6-I	295	297	-	-	-	-	-	-	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Yttrium borides (cont.)																
YB_6	6-I	295	297	-	-	-	300	-	-	-	-	-	-	-	-	-
Yttrium carbides																
YC	5	-	295	-	-	-	-	-	-	-	-	-	-	-	-	-
YC_2	5	294	295	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_2C_3	5	-	295	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_3C	5	294	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-cobalt intermetallics																
YCo_2	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YCo_5	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-copper intermetallics (YCu_5)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium ferride (YFe_5)	6-I	306	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium fluoride (YF_3)	5	407	407	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-gallium intermetallics (YGa_2)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium germanides (Y_5Ge_3) . .	6-I	322	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium hydrides																
YH_2	5	455	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YH_3	5	455	-	-	-	-	-	457	-	-	-	-	-	-	-	-
Yttrium-manganese intermetallics																
YMn_2	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YMn_5	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-nickel intermetallics (YNi_5)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium nitride (YN).	5	621	621	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-osmium intermetallics (YOs_2)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium oxide (Y_2O_3)	4-I	546	-	-	-	-	-	548	550	-	552	-	555-559	-	561	-
Yttrium oxide + Chromium (sesqui-)oxide	4-I	-	-	-	-	-	-	-	-	-	-	-	896	-	-	-
Yttrium oxide + Uranium (di-)oxide	4-I	-	-	-	-	-	-	-	898	-	-	-	-	-	-	-
Yttrium-rhodium intermetallics (YRh)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium silicides																
YSi	6-I	523	524	-	-	-	-	-	-	-	-	-	-	-	-	-
YSi_2	6-I	523	524	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_3Si_5	6-I	-	524	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_5Si_3	6-I	523	524	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium-silver intermetallics (YAg)	6-I	681	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Yttrium sulfides																
YS	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
YS_2	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_2S_3	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_5S_7	5	732	732	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium tellurides (Y_2Te_3)	6-I	-	-	-	-	-	638	-	-	-	-	-	-	-	-	-
Z																
Zinc + Copper	2-I	-	-	-	-	-	659	-	-	-	-	-	-	-	-	-
Zinc + Silver	2-I	-	661	661	-	-	-	-	-	-	-	-	-	-	-	-
Zinc + Zirconium	2-I	-	-	-	-	-	-	-	-	-	-	-	-	-	-	663
Zinc aluminate ($ZnO \cdot Al_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1033	-	-	-	-	-
Zinc antimonide (ZnSb)	6-I	-	-	-	-	-	75	-	77	-	-	-	-	-	-	79
Zinc chromate ($ZnO \cdot Cr_2O_3$)	4-II	-	-	-	-	-	-	-	-	-	1063	-	-	-	-	-
Zinc chromate spinal	4-II	-	-	-	-	-	-	-	-	-	1063	-	-	-	-	-
Zinc ferrite ($ZnO \cdot Fe_2O_3$)	4-II	-	-	-	-	-	1099	1101	1103	-	1105	-	-	-	-	-
Zinc fluoride (ZnF_2)	5	407	407	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc germanide oxide ($2\ ZnO \cdot GeO_2$)	4-II	-	-	-	-	-	-	-	-	-	1167	-	-	-	-	-
Zinc germanium oxide + + Magnesium germanium oxide	4-II	-	-	-	-	-	-	-	-	-	1556	-	-	-	-	-
Zinc germanium oxide + Zinc (ortho-) silicate	4-II	-	-	-	-	-	-	-	-	-	1558	-	-	-	-	-
Zinc lead silicate glass	4-II	-	-	-	-	-	1625	-	-	-	-	-	-	-	-	-
Zinc magnesium aluminum borosilicate glass	4-II	-	-	-	-	-	-	-	-	-	1727	-	-	-	-	-
Zinc oxide (ZnO)	4-I	-	-	-	-	-	563	-	565	-	567	-	569	-	-	-
Zinc oxide + Magnesium oxide	4-I	-	-	-	-	-	-	-	900	-	-	-	-	-	-	-
Zinc oxide + Strontium oxide + + Lithium zirconium silicate	4-II	-	-	-	-	-	-	-	1554	-	-	-	-	-	-	-
Zinc oxide + Tin(ic) oxide	4-I	-	-	-	-	-	-	-	902	-	-	-	-	-	-	-
Zinc oxide + Tin(ic) oxide + + Magnesium oxide	4-I	-	-	-	-	-	-	-	904	-	-	-	-	-	-	-
Zinc selenide (ZnSe)	6-I	-	-	-	-	-	-	-	-	-	363	-	-	-	-	-
Zinc (ortho-) silicate ($2\ ZnO \cdot SiO_2$)	4-II	-	-	-	-	-	-	1340	-	-	1342	-	-	-	-	-
Zinc (ortho-) silicate + + Magnesium (ortho-) silicate	4-II	-	-	-	-	-	-	-	-	-	1575	-	-	-	-	-
Zinc sulfide (ZnS)	5	-	-	-	-	-	726	-	-	-	-	-	-	728-730	-	-
Zinc (ortho-) titanate ($2\ ZnO \cdot TiO_2$)	4-II	-	-	-	-	-	-	1468	-	-	-	-	-	-	-	-
Zircaloy 2	2-I	-	-	-	-	-	599	702	704	-	-	-	709-714	-	-	-
Zircaloy 2, low nickel	2-I	-	-	-	-	-	-	702	-	-	-	-	-	-	-	-

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Zircaloy 4	2-I	-	-	-	-	-	-	702	-	-	-	-	-	-	-	-
Zircon	4-II	1344	-	-	-	-	1346	1348	-	-	-	-	-	-	-	-
Zircon 475	4-II	1344	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zircon CZ-5, Taylor	4-II	-	-	-	-	-	-	1348	1350	-	1352	-	-	-	-	-
Zircon + Beryl	4-II	-	-	-	-	-	-	-	-	-	1577	-	-	-	-	-
Zirconia	4-I	571	571	-	-	571	574	576	578	580	582-587	-	589-593	595	-	597
Zirconium (Zr)	1	1099	1099	-	-	1099	1102	1104	1106	1109	1111	-	1113-1117	-	-	1119
Zirconium no. 715	1	-	-	-	-	-	-	-	1105	-	-	-	-	-	-	-
Zirconium + ΣX_i	2-II	1580	-	-	-	-	1582	-	1584	-	1586	-	-	-	-	-
Zirconium + Aluminum	2-I	-	-	-	-	-	665	-	667	-	-	-	-	-	-	-
Zirconium + Aluminum + ΣX_i . .	2-II	1558	-	-	-	-	1560	-	1562	-	-	-	-	-	-	-
Zirconium + Boron	2-I	669	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium + Hafnium	2-I	671	-	-	-	671	673	675	-	-	677	-	-	-	-	-
Zirconium + Hafnium + ΣX_i . .	2-II	-	-	-	-	-	-	1566	-	-	-	-	-	-	-	-
Zirconium + Indium	2-I	-	-	-	-	-	-	679	-	-	-	-	-	-	-	-
Zirconium + Iron + ΣX_i	2-II	-	-	-	-	-	-	1568	-	-	-	-	-	-	-	-
Zirconium + Molybdenum . . .	2-I	-	-	-	-	-	681	-	683	-	-	-	-	-	-	-
Zirconium + Niobium	2-I	-	-	-	-	-	685	687	689	-	-	-	-	-	-	-
Zirconium + Silver	2-I	-	-	-	-	-	-	691	-	-	-	-	-	-	-	-
Zirconium + Tantalum + ΣX_i . .	2-II	-	-	-	-	-	1570	-	-	-	-	-	-	-	-	-
Zirconium + Thorium	2-I	-	-	-	-	-	-	-	-	-	693-695	-	-	-	-	-
Zirconium + Tin	2-I	697	-	-	-	-	699	702	704	-	707	-	709-714	-	-	-
Zirconium + Tin + ΣX_i	2-II	-	-	-	-	-	1572	-	-	-	-	-	-	-	-	-
Zirconium + Titanium	2-I	-	-	-	-	-	-	715	-	-	-	-	-	-	-	-
Zirconium + Uranium	2-I	717	-	-	-	-	719	721	723	-	725	-	-	-	-	-
Zirconium + Uranium + ΣX_i . .	2-II	-	-	-	-	-	-	1574	-	-	-	-	1576-1578	-	-	-
Zirconium alloys (special designations)																
37I	2-II	1558	-	-	-	-	1560	-	1562	1564	-	-	-	-	-	-
Zircaloys (see Zircaloy)																
Zirconium aluminides																
$ZrAl_2$	6-I	-	39	-	-	-	-	-	-	-	41	-	-	-	-	-
$ZrAl_3$	6-I	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_2Al_3	6-I	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_3Al_2	6-I	-	39	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_3Al_4	6-I	-	3[illegible]	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium beryllides																
$ZrBe_6$	6-I	-	148	-	-	-	-	-	-	-	-	-	-	-	-	-
$ZrBe_9$	6-I	-	148	-	-	-	-	-	-	-	-	-	-	-	-	-

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Zirconium beryllides (cont.)																
$ZrBe_{13}$	6-I	-	148	-	-	-	-	150	152	-	154	-	-	156	-	-
$ZrBe_{16}$	6-I	-	148	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_2Be_{17}	6-I	-	-	-	-	-	-	-	-	-	-	-	-	156	-	-
Zirconium borides																
ZrB	6-I	-	-	-	-	-	-	-	281	-	-	-	-	-	-	-
ZrB_2	6-I	274	274	-	274	-	277	279	-	-	283	-	286-288	291	-	293
ZrB_{12}	6-I	274	274	-	-	-	277	-	281	-	-	-	-	-	-	-
Zirconium (di-)boride cermet .	6-II	842	-	-	-	-	844	846	848	-	850	-	-	-	-	-
Zirconium (di-)boride + + Molybdenum (di-)boride . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (di-)boride + + Molybdenum (di-)silicide . .	6-I	-	589	-	-	-	-	-	-	-	691	-	-	-	-	-
Zirconium (di-)boride + + Niobium (di-)boride	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (di-)boride + + Tantalum (di-)boride. . . .	6-I	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium carbide (ZrC). . . .	5	263	263	-	-	-	265	267	269	271	273	-	277-283	-	-	285
Zirconium (pyro-)carbide . . .	5	-	-	-	-	-	-	-	-	-	273	-	-	-	-	-
Zirconium carbide + Graphite .	5	-	-	-	-	-	-	-	-	-	825	-	-	-	-	-
Zirconium-cobalt intermetallics ($ZrCo_2$)	6-I	-	685	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium ferride ($ZrFe_2$) . . .	6-I	-	366	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium fluoride (ZrF_4) . . .	5	407	407	-	-	407	-	-	-	-	-	-	-	-	-	-
Zirconium fluoride + Lithium fluoride	5	-	413	-	-	-	-	-	-	-	-	-	-	-	-	415
Zirconium fluoride + Rubidium fluoride	5	-	417	-	-	-	-	-	-	-	-	-	-	-	-	419
Zirconium fluoride + Sodium fluoride	5	-	421	-	-	-	-	-	-	-	-	-	-	-	-	423
Zirconium germanides																
ZrGe	6-I	-	323	-	-	-	-	-	-	-	-	-	-	-	-	-
$ZrGe_2$	6-I	-	323	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_3Ge	6-I	-	323	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_5Ge_3	6-I	-	323	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium hydride (ZrH_2) . . .	5	459	-	-	-	-	-	461	463	-	465	-	-	-	-	-
Zirconium nitride (ZrN)	5	602	602	-	-	-	-	604	606	608	610	-	613-615	-	-	617-619
Zirconium (di-)oxide (ZrO_2) . .	4-I	571	571	-	-	571	574	576	578	580	582-587	-	589-593	595	-	597
Zirconium (di-)oxide foam. . .	4-I	-	-	-	-	-	-	-	-	-	587	-	-	-	-	-
Zirconium (di-)oxide mix 148 .	4-I	-	-	-	-	-	-	-	916	-	-	-	-	-	-	-
Zirconium (di-)oxide mix 187 .	4-I	-	-	-	-	-	-	-	916	-	-	-	-	-	-	-

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Zirconium (di-)oxide Norton mix 302	4-I	-	-	-	-	-	-	-	-	590	-	-	-	-	-	-
Zirconium (di-)oxide ZP-58 . .	5	-	-	-	-	-	-	799	-	-	-	-	-	-	-	-
Zirconium (di-)oxide ZP-71 . .	5	-	-	-	-	-	-	799	-	-	-	-	-	-	-	-
Zirconium (di-)oxide coating on Inconel	6-II	-	-	-	-	-	-	-	-	-	-	-	-	1397	-	-
Zirconium (di-)oxide coating on Inconel X	6-II	-	-	-	-	-	-	-	-	-	-	-	1399	1401	-	-
Zirconium (di-)oxide + ΣX_i . .	5	-	-	-	-	-	-	799	-	-	-	-	-	-	-	-
Zirconium (di-)oxide + Aluminum oxide	4-I	-	-	-	-	-	-	-	-	906	908	-	-	-	-	-
Zirconium (di-)oxide + + Beryllium oxide + Aluminum oxide	4-I	-	-	-	-	-	-	-	-	-	910	-	-	-	-	-
Zirconium (di-)oxide + Calcium oxide	4-I	-	-	-	-	-	912	914	916	918	920	-	923	-	-	-
Zirconium (di-)oxide + Calcium oxide + Cerium (di-)oxide . .	4-I	-	-	-	-	-	-	-	925	-	-	-	-	-	-	-
Zirconium (di-)oxide + Calcium oxide + Silicon (di-)oxide . .	4-I	-	-	-	-	-	-	-	-	-	927	-	-	-	-	-
Zirconium (di-)oxide + Cerium (di-)oxide	4-I	-	-	-	-	-	-	-	-	929	931	-	-	-	-	-
Zirconium (di-)oxide + + Dysprosium oxide	4-I	-	-	-	-	-	-	-	-	-	934	-	-	-	-	-
Zirconium (di-)oxide + Hafnium + + Magnesium	5	-	-	-	-	-	-	797	-	-	-	-	-	-	-	-
Zirconium (di-)oxide + Hafnium (di-)oxide	4-I	-	936	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (di-)oxide + + Magnesium oxide	4-I	-	-	-	-	-	938	-	940	942	944	-	-	-	-	-
Zirconium (di-)oxide + + Magnesium oxide + Beryllium oxide	4-I	-	947	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium (di-)oxide + Niobium (pent-)oxide	4-I	-	949	-	-	-	-	-	-	-	951	-	-	-	-	-
Zirconium (di-)oxide + + Phosphorus (pent-)oxide . .	4-I	-	-	-	-	-	-	-	-	-	953	-	-	-	-	-
Zirconium (di-)oxide + Silicon (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	955	-	-	-	-	-
Zirconium (di-)oxide + Thorium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	956	-	-	-	-	-
Zirconium (di-)oxide + Titanium cermet	6-II	-	-	-	-	-	-	826	828	830	832	-	-	-	-	-
Zirconium (di-)oxide + Titanium (di-)oxide	4-I	-	-	-	-	-	-	-	-	-	960	-	-	-	-	-
Zirconium (di-)oxide + Uranium (di-)oxide	4-I	962	964	-	-	-	-	-	-	-	966	-	-	-	-	-
Zirconium (di-)oxide + Yttrium oxide	4-I	-	-	-	-	-	-	-	968	-	970	-	-	-	-	-
Zirconium (di-)oxide + Yttrium oxide + Cerium (di-)oxide . .	4-I	-	-	-	-	-	-	-	972	-	-	-	-	-	-	-

Material Name	Volume	Density	Melting Point	Heat of Fusion	Heat of Vaporization	Heat of Sublimation	Electrical Resistivity	Specific Heat	Thermal Conductivity	Thermal Diffusivity	Thermal Linear Expansion	Thermal Absorptance	Thermal Emittance	Thermal Reflectance	Thermal Transmittance	Vapor Pressure
Zirconium (di-)oxide + Yttrium oxide + Zirconium cermet. . .	6-II	-	-	-	-	-	-	-	334	-	-	-	-	-	-	-
Zirconium (di-)oxide + + Zirconium cermet	6-II	-	-	-	-	-	-	-	-	836	838	-	-	-	-	840
Zirconium (di-)oxide ZT-15-M cermet	6-II	-	-	-	-	-	-	826	-	830	-	-	-	-	-	-
Zirconium phosphates																
$ZrO_2 \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1185	-	-	-	-	-
$2\ ZrO_2 \cdot P_2O_5$	4-II	-	-	-	-	-	-	-	-	-	1185	-	-	-	-	-
Zirconium (ortho-)silicate ($ZrO_2 \cdot SiO_2$)	4-II	1344	134[illegible]	-	-	-	1346	1348	1350	-	1352	-	-	-	-	-
Zirconium (ortho-)silicate + + Beryllium aluminum silicate	4-II	-	-	-	-	-	-	-	-	-	1577	-	-	-	-	-
Zirconium silicides																
ZrSi	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$ZrSi_2$	6-I	517	517	-	-	-	-	-	-	-	519	-	-	521	-	-
Zr_2Si	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_3Si_2	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_4Si	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_4Si_3	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_5Si_3	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zr_5Si_4	6-I	517	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium tantalum carbide ($Ta_xZr_yC_z$)	5	-	-	-	-	-	-	-	-	-	297	-	290	-	-	-
Zirconium titanate ($ZrO_2 \cdot TiO_2$).	4-II	-	-	-	-	-	-	-	-	-	1470	-	-	-	-	-
Zirconium uranium carbide ($Zr_xU_{1-x}C$)	5	-	-	-	-	-	292	-	-	-	-	-	-	-	-	-
Zirconium-vanadium intermetallics (ZrV_2)	6-I	-	585	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirox, grade A	4-I	-	-	-	-	-	-	-	-	-	582	-	-	-	-	-
ZT-15-M zirconium (di-)oxide cermet	6-II	-	-	-	-	-	-	826	-	830	-	-	-	-	-	-